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Battelle Technical Review

BATTELLE MEMORIAL INSTITUTE

CARBON COORDINATOR

JOHN FARLEY FOSTER

He was told, "You can't make a transformer insulator from that plastic you're working with." But the next day, the young chemist placed the finished insulator on his chief's desk. Unfortunately for the story, the insulator was too costly to be practicable. Fortunately for research, the young chemist had learned an important lesson. John Farley Foster had been reminded early in his research career that scientists may learn much from their failures.

John is applying that lesson in the planning of the September meeting of the American Chemical Society. As chairman of the Division of Gas and Fuel Chemistry of ACS, he is helping to set up a symposium on "Properties and Reactions of Carbons." Half of the papers will be presented by scientists who are not gas and fuels specialists. But the subject is important to all gas and fuel chemists.

John explains: "There is a good reason for this fresh approach to the problems of carbon. Carbonaceous materials occur in many forms, have many structures, and contain many different impurities. Various industries use their own forms of carbon, and they usually have a theoretical and practical knowledge of their own materials. But no broad framework of knowledge has been built up. Scientists are often unable to explain why carbon takes its particular forms or why it reacts as it does under different conditions."

It is his belief that if carbon specialists from various fields pool their knowledge, a more useful understanding of the element may emerge. When carbon-black technologists tell what they have learned, makers of carbon electrodes may know more about what can and cannot be done with their own material.

When John was awarded his doctorate at Stanford University in 1934, his principal interest was in electric charges on surfaces. He engaged in research in this field for several years with General Electric, particularly in the development of condensers. When he joined Battelle in 1943, John applied his knowledge of surface chemistry to research on the gasification of solid fuels.

In more recent years, much of John's work has been in the field of fuel gas and he is co-editor of the book, *Economics of Fuel Gas From Coal*. He and his colleagues have conducted explorations into heretofore uncharted areas of inorganic chemistry. These have led to new phospho-nitrilic compounds which have intriguing possibilities. And new methods for controlling nonfuel gases and gas mixtures have come out of his studies in physical chemistry.

These contributions have brought professional recognition. He is a member of the Chemical Committee of the American Gas Association, and he served last year as chairman and co-chairman, respectively, of the Combustion Session of the Second Midwestern Conference on Fluid Mechanics and of the ACS Symposium on Combustion Chemistry.

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Research and Inflation

Recent stories of technical accomplishment in the trade and business press emphasize the role of research in reducing production costs and easing materials squeezes in manufacturing. Many companies are finding that relatively small investments in research can lead to savings in critical materials and manpower without sacrifice of, and frequently with improvement in, quality. These savings tend to prevent price rises of consumer products, even in the face of increased material and labor costs. Also, by extending the available supplies of critical materials, research is making possible the production of more units, with subsequent lessening of inflationary pressure.

In some instances, savings in both materials and labor are being effected merely by checking each material in relation to its function. One large company is reported to have cut its production costs by millions per year by surveying each component of its products and each manufacturing operation, and eliminating extravagant use of materials and labor. For instance, by using a tin-plated steel spring clip instead of a bronze clip to hold the cover on a control unit, the function is served at half the cost and with a savings of bronze. The same company worked out a quality-control inspection system for one of its suppliers to eliminate unnecessary piece-by-piece inspection and handling. For its efforts the company is now saving more than one hundred thousand dollars a year in the cost of a stainless steel pin.

Many of the most important savings in materials result from the application of past research or from broad programs of current research vigorously prosecuted. The advances made in plastics technology over recent years are responsible for tremendous savings in metals. Past research on the use of boron in steel is now paying off in the conservation of alloying materials. Because of the great technical strides made by the petroleum and chemical industries, the power industries, mining, and agriculture, we are able to keep prices within the means of consumers.

The companies that are using research today to keep prices of their products down are doing a public service now—one that may be of great value later if inflationary pressures increase.

Research acts in various ways to combat inflation. It makes materials go further by showing how they can be used to best advantage. It develops new materials to take the place of those in short supply and those priced "out of the market." It leads to more economical processes and increased production per man-hour of labor. The increased production thus achieved puts more goods on the market and helps prevent the bidding up of prices.

Examples of how research reduces prices may be seen on every side. The cost of ten cubic centimeters of one type of penicillin has dropped from six dollars in 1949 to less than two and one-half dollars today. Magnesium, which cost five dollars a pound during World War I, is now twenty-four and one-half cents a pound. Television, fiber glass, nylon, DDT—these are only a few of the products whose prices have run counter to the inflationary trend because of research.

In still other ways, research tends to combat inflation. By creating new products and new businesses, it increases competition. Research, unlike artificial control methods, tends to satisfy the wants and needs of people, rather than defer them. More purchasing power is consumed in legitimate channels. The extra production created through research is a source of revenue to the government.

Most important, perhaps, is the fact that technological advances that make more products available gradually turn synthetic business prosperity into actual business prosperity. The extra goods made possible raise the standards of living of all. The new industries created provide continuing employment and continuing sources of new wealth. Business recessions and economic depressions normally expected to follow inflation are averted or moderated.

Clyde Williams

Director, Battelle Memorial Institute

Alternative Materials

by MURRAY C. UDY

Dr. Udy was the recipient of a Battelle Fellowship in 1939 while he was a graduate student at Ohio State University. After receiving his Ph. D. degree in 1941, he continued his association with the Institute. His research has included work on boron in steel, quench cracking in steel, foundry practice for beryllium, and centrifugal casting of steel. He has also contributed to Battelle's atomic energy research.

IN TIMES of national emergency, shortages of many so-called strategic materials develop. To keep the the wheels of defense and industry rolling, engineers, scientists, and industrialists have had to devise and develop substitutes, or alternatives, as stand ins for materials in short supply.

The objections to most alternative materials are that they are poorer in quality, cost too much, or require changes in standard techniques or equipment. It is often said they are impractical except when the Government is footing the bill.

In many cases the objections are valid. However, there are many more instances in which the alternative material proves to be superior in performance to the original material; it may even compete favorably in a normal economy.

One unusual case of an expensive material substituting for a cheaper, but unavailable one, occurred in World War II. The Government loaned a large part of its silver "hoard" to substitute for hard-to-get copper as bus-bar material. The use of expensive silver as alternative material was justified because it was a nondestructive use. The silver could be replaced as copper again became available.

Conserving Copper

Copper has again come into short supply, and alternative materials for its many uses are being devised. For example, aluminum has replaced brass in electric light bulb bases. This called for the development of sealing and soldering techniques for aluminum. It may be a permanent replacement. Aluminum is also replacing copper in many bus-bar applications. Here, joining is a problem. It has been solved in some instances by developing a silver-plating practice for the aluminum. After the selected areas of the aluminum bus-bars have been silver plated, the plated areas can be joined by conventional soldering techniques. Although to get the conductivity of copper, a larger aluminum bar must be used, there is an over-all saving in weight. Aluminum is not so rigid as copper, therefore, more support must be provided. Another technique allowing substitution of aluminum for copper in electrical applications, is copper cladding of aluminum. Composite bars are formed which have copper on the surface where good joining qualities are desired. In this way, 90 to 95 per cent of the copper normally required is replaced by aluminum.

Steel may be clad with aluminum, the aluminum supplying high electrical conductivity and the steel core lending strength. Aluminum-clad steel has replaced considerable nickel in electronic tubes. Here it is performing so well that return to nickel will probably never occur. Clad combinations of other materials such as titanium on steel, copper on magnesium, lead on steel, and lead on copper are available and are finding some applications.

Electroplated wires that can be drawn, formed, and processed without flaking have been developed. They are finding applications where they save up to 80 per cent of the scarce materials. Copper, brass, or nickel on steel, and nickel or silver on copper are available, and their uses are expanding.

Alternatives for copper in other than electrical applications are also being developed. For example, most of the automobile companies have aluminum radiators under test.

Alternatives in Steel Alloys

Alloy steel is a big tonnage item in the American economy. Materials such as manganese, nickel, chromium, molybdenum, and vanadium are added to iron to produce these alloys. During World War II, all of these alloying materials were in short supply. The reasons for the shortage were the rapidly expanded demand for the alloy steels and the cutting off of foreign sources of the alloying materials, particularly manganese and chromium. At that time, the alloy materials were extended by devising a series of steels called National Emergency steels. They utilized to the utmost the alloying elements in the scrap being returned to the steel mills. Careful scrap segregation was necessary. It was found that in many cases, small amounts

of several elements used together in an alloy steel developed the desired properties with less total alloying element than if the properties were developed by adding one alloying element alone. At first, consumers accepted the National Emergency steels with great reluctance. However, by the end of the war, they were well accepted. Indeed, their use continued in some applications even when the alloying materials became more abundant. The designation "National Emergency" was dropped from these steels and many of them were added to the lists of standard steels.

During the present "emergency", the shortage of alloying materials for use in alloy steels has again become acute. It is even worse than in World War II. Reasons for this shortage are: the greatly increased capacity for producing steel without comparable increase in ferroalloy supply; diversion of ferroalloys to production of high-temperature alloys for jet engine use; and increased military requirements for ferroalloys and alloy steels. In particular, nickel and molybdenum are in short supply.

Shortages are so acute that even the already lean National Emergency steels of World War II do not conserve enough ferroalloys. Some relief is obtained by specifying steels with even less nickel and molybdenum and slightly increased chromium and manganese contents. Chromium and manganese are not yet in such short supply as nickel and molybdenum.

This juggling to reduce the use of alloys in shortest supply, and at the same time to utilize fully the alloy content of returned steel scrap, was possible because, in most cases, this class of steels is used in a quenched and tempered condition. Substitution of one steel for another depends upon the hardenability conferred upon it by the alloying elements. This property called hardenability is the measure of the depth below the surface of a piece at which maximum hardness is reached on quenching. Generally, if two steels have about the same equivalent hardenability, one may be substituted for the other. Furthermore the match in hardenability needs only extend to a depth relevant to the size of the part under consideration.

The effect of alloying elements on hardenability depends on the amount of each element present. Since each added element multiplies the effects of the others, several combinations of elements will result in the same over-all hardenability. Thus, composition may be juggled to get the desired hardenability with minimum use of the elements in most critical supply.

There is one bright spot in the alloy-steel picture. Shortly before World War II, it was discovered that boron is an excellent alloying element. It is obtained from borax and is therefore plentiful. When added to steel, it increases hardenability out of all proportion to what normally would be expected from the size of the addition. For example, additions of 0.002 to 0.005 per cent boron increase the hardenability of steel by amounts that would require several tenths of a per cent of nickel, manganese, chromium, or molybdenum. The mechanism of this effect of boron has not yet been explained. Boron has little or no effect on other properties of the steel to which it is added. Here is a potent means for conserving some of the critically short alloys. Considerable use was made of boron steels during World War II, and some companies continued to use them after the war. However, consumers are as reluctant to accept boron steels as alternative materials as they were to accept the National Emergency steels during World War II. It appears, however, that like the National Emergency steels, boron steels will find a permanent place in our economy. They are potentially cheaper than the steels they can be substituted for. In addition, they offer the advantages of better forging and welding characteristics and better machinability than the more highly alloyed steels of equivalent hardenability which they replace. Like all other substitutions, there must be some changes in handling procedure. Boron cannot be added to steel indiscriminately. Larger additions than those mentioned lead to hot shortness.

Standard boron-containing steels have been devised in which boron is used along with the alloying elements, chromium and manganese. This provides steels of desired properties to substitute for pre-emergency steels. In some instances, boron additions to plain-carbon steels have produced sufficient hardenability for many uses. The use of boron in conjunction with small amounts of vanadium appears in others of the new standard steels.

Stainless Steels

The stainless steel field is also affected greatly by shortages of alloying materials. Perhaps the most critical shortage is that of niobium, which has been used in certain grades of stainless steel to stabilize it against intergranular corrosion. Two methods of attack are being used to ease the effects of the niobium shortage. The first seeks to find an alternative stabilizer to replace the niobium. Success has been very limited in this direction, but, titanium finds some use in stainless steel. Mixtures of tantalum, and lesser amounts of niobium, as they occur together in nature, are also used. Preliminary tests with other materials such as zirconium and hafnium as stabilizers have not been promising.

More success has been realized by removing carbon from the stainless steel so that stabilization is unnecessary. The melting practice for producing low-carbon

Alternative steels should be as easy to fabricate as those they replace. Here, an experimental steel is being shaped by forging.

stainless steel is a difficult one, involving the use of oxygen and higher-than-normal temperatures. This results in a more expensive product.

Stainless steel users are also suffering because of the nickel shortage. The result here is twofold. First, there is a shift from chromium-nickel stainless to straight chromium stainless steel. This shift is satisfactory in many applications, and possibly indicates overspecification in the first place.

The second result is substitution of other materials for nickel in stainless steel compositions. That stainless properties can be obtained in the 18-8 types, when part or all of the nickel is replaced with manganese, has been known for some time, but has not received much favor. Such a substitution if extensive, might upset the manganese-supply situation.

One hears rumors that a stainless steel in which titanium is used in place of nickel is in the development stages. This might be an acceptable substitution if good properties can be obtained, because titanium is in relatively good supply as a ferroalloy.

New precipitation-hardening stainless steel compositions have been announced. One contains 17 Cr, 7 Ni, and 1.5 per cent Al, while the other contains 17 Cr, 4 Ni, and 4 per cent Cu. After fabrication, properties are developed by a low-temperature anneal. These alloys can replace: other stainless steel compositions normally hardened by cold working, straight chromium heat-treatable compositions, and in certain aircraft structural applications, aluminum and magnesium alloys. They have a high strength-weight ratio.

Another relatively new development in the stainless field allows substitutions not previously considered possible. This is the addition of rare-earth metals, in the form of misch metal, to compositions not previously believed to be workable. The result is an extension of the composition range of workable alloys and a relaxation of some of the composition specifications. Similar results are being obtained with some of the high-temperature alloys.

Addition of misch metal to ordinary low and medium alloy steels has improved their impact resistance. Part of the effect is the result of sulfur removal by the misch metal.

Misch metal additions in larger amounts to aluminum and magnesium-base materials give alloys with improved high-temperature properties.

Nickel is being saved, to the extent of 25 to 50 per cent of that previously used, in cast alloys intended for use at 900° to 1400°F., by the use of a 21 Cr, 9 per cent Ni alloy. Properties are as good as those of the higher nickel alloys formerly specified.

In small springs, an alternative compostion, 56.5 Cu, 12 Ni, and 31.5 per cent Zn, replaces 55 Cu, 18 Ni, and 27 per cent Zn. This also conserves considerable nickel.

In the automotive field, development work is under way toward replacement of certain steel parts with magnesium. While these developments will probably be too costly for passenger-car application, commercial vehicles, where weight is an economic factor, will probably benefit.

Other Conservation Measures

Titanium is a relatively new commercial product. Its alloys have a high strength-weight ratio and will find some applications where they replace stainless steel, aluminum, and magnesium alloys. In sheet form, titanium is being used by one aircraft manufacturer for shrouds, cowls, redundant bulkheads, and firewalls. The shrouds, for example, must withstand 400° to 500°F., and this appears to be an excellent application for titanium. At high speeds, air friction produces temperatures too high for aluminum alloys. Therefore, considerable interest is evident in the use of titanium for aerodynamic surfaces of supersonic aircraft.

Titanium-alloy sheet is under consideration for rib sections of the fuselage. Alloy forgings are being developed for jet engine parts. Titanium rivets and bolts are being considered as weight-saving measures. Hy-

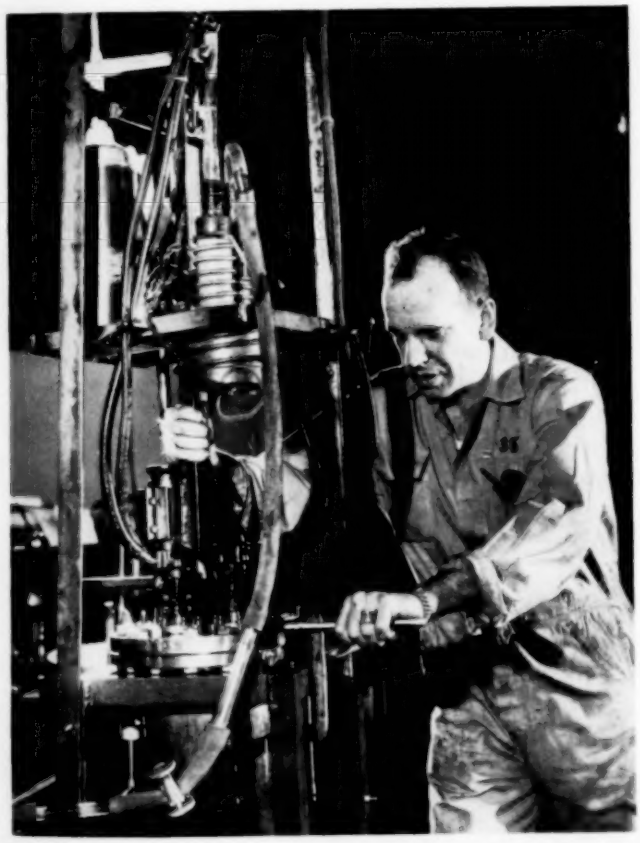
draulic lines of titanium are also under consideration.

The other outstanding property of titanium is its corrosion resistance. For this reason, it is finding use in chemical-processing equipment and marine installations. Large-scale use probably awaits lowering of the price to a competitive figure.

Another recent development, principally for marine use, is a nickel plate on aluminum. The bond material, a synthetic organic base, is first sprayed on the aluminum part, then nickel is plated on by conventional means. This results in a stress-free, hard, yet resilient coating.

Electroplated alloy coatings have been developed as alternative materials. For example, an 80 Sn, 20 per cent Zn electrodeposit can substitute for cadmium plating. A 45 Sn, 55 per cent Cu electrodeposit (called speculum) can substitute for silver and is not so readily tarnished, and a 65 Sn, 35 per cent Ni electrodeposit can be a substitute for chromium plate. This latter plate has a pinkish color with high luster, and has good corrosion resistance.

Tungsten is another material that is not readily available at present in this country. The substitution of molybdenum for tungsten in high-speed tools is well known, but molybdenum is short too. Tungsten finds a large use as the carbide in cemented carbide tools and other parts, and in abrasion-resistance applications. In cemented carbide parts, tungsten carbide is bonded with metallic cobalt. Not only is tungsten scarce, but the cobalt used for binding material is in big demand for high-temperature alloys and is generally scarce. This is a big potential field for alternative materials. Recently, chromium carbides cemented with nickel have been announced. They have the advantage over cement tungsten carbides of lighter weight, better corrosion resistance, and production from less scarce materials.



Special equipment is needed to produce high-purity metals for research. The equipment shown here is being assembled for the preparation of titanium.

Titanium carbide, either self-sintered or cemented with cobalt or nickel, has also been advocated as an alternative for cemented tungsten carbide. Other hard materials are being tested.

New fabricating processes may lead to savings in materials and make possible the use of alternative ones. A new development is a hot-extrusion process developed in France by which it is possible to extrude hollow and solid sections of metals which normally forge with great difficulty. This process also permits finer and more complicated sections than previously possible, even with more readily forgeable materials. Glass is used as a lubricant and as insulation for the die from the heat of the billet being extruded.

A new cold-extrusion process for steel produces such items as shells from bar stock. Considerable saving in material is claimed over previously used processes.

Plastics as Alternative Materials

Plastic materials are entering the picture in many applications as alternatives for metals. Plexiglas has been used for tooth filling in place of more expensive metal fillings. The Air Force is currently testing the effects of altitude on the behavior of Plexiglas tooth fillings. Plexiglas is reported to have extremely good resistance to corrosion by mouth fluids.

Polyethylene plastics are applicable to a wide number of uses. They have good chemical resistance, good heat stability, and good dimensional stability almost to the melting point. New forming and joining methods have been developed for these materials. A casting procedure called spincasting, which resembles centrifugal casting of metals, overcomes some of the size and shape limitations of molding in presses. The material can be welded by true fusion welds. A torch blows hot, inert gas, usually nitrogen, on the spot to be welded. Filler rod is used, much as in metal welding. A technique of flame spraying permits coating of preheated metal with a well-bonded layer of high corrosion-resistant plastic.

Polystyrene is finding many new applications, many

of them as alternatives for metals. Polystyrene pipe, although not usable in the petroleum industry, is suitable for mine pipe, and for furniture and military housing piping. Low-temperature brittleness is a problem but this may be solved soon. An extruded, glass-filled, polystyrene laminate is being developed.

Unplasticized polyvinyl chloride extrusions have been widely used in chemical plants, as a replacement for special alloys, to carry both acids and alkalis. It has proved superior to metallic pipe for carrying acidic crude oil. The material is extruded in standard pipe and tubing sizes. It is rigid, but not brittle, and welding, cementing, and bending can be easily accomplished.

Glass-reinforced polyester plastics have a better strength-weight ratio than steel and good impact resistance. They have been publicized recently in custom-built automobile bodies. They have found large-scale application in home appliances, chemical tanks, protective safety helmets, electrical insulation laminates, precision-molded housings, skis, fishing tackle boxes, chairs, and coffins. This list does not include the military applications. Many of these "substitutions" will be permanent.

High-Temperature Materials

A new fibrous silica insulation material has been developed as a substitute for asbestos. It is an improvement over the latter. It withstands temperatures to 1800°F., is cheaper than asbestos, and has a lower density. New applications other than heat insulation include uses in electrical insulation, as filter media, and as laminations for reinforced plastics.

New ceramic coatings on metal for high-temperature applications are allowing use of less highly alloyed material or are prolonging the life of materials conventionally used. This is an important application.

This discussion of alternative materials has not been all-inclusive, but is a fair cross section. Other substitute materials are being applied successfully and new alternatives will continue to be developed.

Although chance has dictated many of the applications of alternative materials, many of them have been developed by the deliberate search demanded by necessity. Some will find only temporary use, but many will find important permanent places in our economy. Thus, we are indebted to the "emergencies" for the stimulus they have given to research.

ENGINEER VS. APPLIED-SCIENTIST

"At a centennial celebration of engineering societies in New York City, Dr. Vannevar Bush, president of the Carnegie Institute, pointed out the danger 'that the engineer will become set in a groove and that much of his function will be taken over by applied-scientists.' The engineering profession has already seen the scientists step into atomic energy and radar and grow up with them. The invaders are almost certain to take over a few more fields in the future.

"The dividing line between science and engineering is rather hazy, to begin with. Dr. Bush clears it up this way: 'An engineer is a man who applies science in an effective manner to supply human needs and desires. But . . . an applied-scientist . . . apparently does almost the same thing. The difference lies in the definition of the word effective. The applied-scientist is ordinarily satisfied if he can develop a new device or a new process or a new material which will work in a practical manner, often for his own use or for the use of other scientists. To some extent, therefore, the engineer takes over when the applied-scientist leaves off.'" — *Business Week*

Fighting Marine Destruction

by Ray E. Heiks

Dr. Heiks taught in the Chemistry Department of Marshall College after receiving his Ph. D. at Ohio State University in 1940. He has been associated with Battelle since 1942. A member of the Seahorse Institute, he has studied the results of exposure of all types of materials to marine deterioration. His studies have also covered the chemistry of wood preservatives, antifouling paints, and textile preservatives.

The sea gives of its bounty to man. But at the same time it also destroys much of man's handiwork. This destruction is carried on in many ways:

A ship's bottom can pick up a load of barnacles that may increase fuel consumption up to 50 per cent, and cut top speed by two to five knots . . .

The wood pilings of a pier can be completely destroyed in a few months if unprotected from marine borers . . .

Expose a strip of bare steel to sea water or sea air. In time, corrosion sets in, its speed and extent varying with climatic and sea water conditions . . .

Chemists and metallurgists have been studying protective remedies for these and similar marine problems for many years. They have made remarkable progress in providing better protective coatings, wood preservatives, and corrosion-resistant materials.

The annual cost of waste and destruction resulting from "marine attack," however, still is in the billion dollar category. In coming years, with the backlog of knowledge already available, this economic burden should be greatly reduced.

Protection against "marine attack" is of direct concern to owners and operators of ships and dock facilities, including the Armed Services. It is of concern to telephone and electric utility companies who lay cable in sea water. In fact, "marine attack" concerns all industries and services that have marine or shore-based installations and equipment to maintain, or that process metal, wood, chemical, or cordage products for those installations and equipment.

Fighting Marine Pests

Among the marine borers, the Teredo, or shipworm, is one of the most destructive that has ever plagued mankind. Within a few months, a horde of shipworms has been known to destroy completely a pier worth millions of dollars. Embryonic Teredos are hardly visible to the human eye as they lie on the surface of a wood piling. They grow to maturity as they bore themselves into the interior of the wood piling. Some reach sizes of many feet in length. Once buried inside, there is no obvious indication of the damage they are doing.

Recently, at Battelle's North Florida Research Station, we have found it possible to take pictures of the damage caused by marine borers, by using a simple dentist's X-ray machine. This offers the first really reliable scientific tool for detecting marine borer activity. It is expected to lead to important discoveries for controlling borer damage. A cheaper means of introducing copper into wood preservatives is being studied. Certain copper derivatives are very good against attack by Limnoria, a species of marine borer which is difficult to control in any other way.

Another marine pest, the barnacle, has an uncanny fancy for latching itself onto the underside of a ship's hull. Great quantities of these barnacles reduce a ship's speed, cause greater fuel consumption, and the additional expense of frequent drydocking. A few years ago, a new antifouling paint was developed by Battelle in cooperation with the major copper companies. It prevents fouling by barnacles and other marine organisms, up to four times as long as previous treatments. This has been demonstrated on all types of craft, and in cold, temperate, and tropical waters. A finely divided copper flake mixed into the special paint formulation permits maximum effectiveness and long life.

Attack Against Corrosion

Protection of ship parts and cargoes has always been one of the major battlegrounds in the fight against corrosion. Steel, the most commonly exposed metal, is usually protected from marine atmospheres by specially formulated paint systems. Most of those now in use employ mineral pigments such as red lead, zinc or lead chromate, iron oxide, titanium oxide, or aluminum flake. A clearer understanding of how these paints protect is needed. As this is obtained, longer life for anti-corrosive paints currently in use may be expected.

Better corrosion-resistant alloys are also in the picture. Under mixed industrial-marine atmospheric conditions, it has been found that certain steels containing small additions of copper, or copper and phosphorus,

are much more corrosion-resistant than ordinary steel. Additions of silicon helps to improve corrosion resistance. Particularly effective are substantial additions of chromium. An alloy with five per cent chromium shows roughly one-fifth the loss in weight of a copper-bearing steel.

Copper-base alloys, containing substantial amounts of nickel, have been found particularly useful to resist attack by high-velocity sea water on the condenser tubes of ocean steamers and naval vessels. Recent work in England and America has shown that these so-called cupro-nickels have much longer life if a small amount of iron is also present.

The recent exploits of the new ship, the *United States,* have helped publicize the use of aluminum in ship construction. The extensive use of the light metal in the superstructure contributed much to the ship's qualities. But in addition to its light weight, aluminum also has excellent resistance to corrosion. Aluminum alloy sheet and plate, clad with pure aluminum, has been used satisfactorily in ships for some time. And even though alloys in marine service must sometimes be painted as added protection against corrosion, the paint performs better on aluminum than on steel.

For resistance to sea water, however, titanium and its alloys are unexcelled by any of the commercially available metals. As production of the new metal is scaled upward, it is expected to be an important marine metal for such applications as condenser tubes, piping, and exposed fittings.

Dehumidification, or "moth balling," of naval vessels has received wide attention since the end of World War II. Using this method, metal parts are protected from corrosion by keeping them in an enclosed space with the relative humidity at 30 per cent or less. Dehumidification equipment is now being mass produced. Its use for a wider variety of corrosion-resistant purposes is visualized.

There is a general awakening on the part of management to reduction of hidden costs such as those traceable to corrosion by sea water and sea air and to fouling by marine organisms. Research will continue to respond to management's needs. Information on improved technological practice is being more widely disseminated. And as better materials and processes are devised, the battle will continue to reduce the unseen economic toll exacted by the destructive forces of nature.

SPREADING THE BENEFITS OF SCIENCE

Science and technology have been put to work to better the lot of mankind in specific areas and over the world as a whole. The biological sciences are extending knowledge of biological functions, and in the wake of this kind of research better crops and better farm animals are raised and food supply has been enhanced . . . Experts in all the fields emphasize how much more there is to learn, and with the acceleration of the learning process—research—it is safe to predict that scientific progress will keep pace with the expanding needs of the human race for some time to come.

. . . The scientists are advancing their respective sciences and their applications so rapidly that it requires other disciplines to spread the progress that is being made more equally among the peoples of the earth. This should not be done by gift and loan, but by extension, adaption, and application of new technologies in all parts of natural regions. — *Howard A. Meyerhoff*

Notes From Battelle

RESOURCES FOR FREEDOM

The President's Materials Policy Commission was set up on January 22, 1951. It was asked to study the future materials problems of the United States and the relationship of that problem to the free and friendly nations of the world. Numerous organizations and individuals were asked to help in rounding up and interpreting the necessary data.

The Commission's five-volume report, *Resources for Freedom,* was released on June 1. Of the 15 chapters making up Volume IV, *The Promise of Technology,* seven were prepared by Battelle scientists. Battelle studies were also the partial basis for other chapters and other volumes.

The Commission asked Battelle to help appraise the significant technological developments that can and may alter materials supplies over the next 25 years. In line with this request, Battelle undertook 41 specific assignments. The resulting reports dealt with various aspects of steel-making materials, nonferrous metals, nonmetallic materials, energy and fuels—both conventional and unconventional, and a series of across-the-board studies including discovery techniques, methods of waste suppression, corrosion prevention, and the resources of the ocean.

In each study the following points were considered: (1) developments that may lead to new sources of supply and possible alternative materials sources; (2) developments that point to more efficient use of materials; and (3) developments that may increase or decrease the needs for materials.

LOUISVILLE STUDY UNDERWAY

A gray haze often hangs over Louisville, Kentucky, and irritating gases occasionally make citizens' eyes smart. As a result, eight companies in the Rubbertown industrial area decided to do something about the situation. They are sponsoring a survey to find the causes and to learn how conditions can be improved.

The survey is being conducted by a team of Battelle technologists under the leadership of Richard B. Engdahl. As part of the study, air sampling will be done in selected parts of the city. Analysis of resulting samples will help to determine the concentration of gaseous and other contaminants under varied weather conditions. It is expected that with this data, it will be possible to pin-point plants that might be adding to air contamination.

The committee of the sponsoring companies points out that on the basis of previous studies, "industry in the Rubbertown area is by no means sure that the air-pollution problem can be laid entirely at its door." Industry in Rubbertown, however, does plan to do whatever can reasonably be done to improve the situation once the true facts have been ascertained.

The survey agreement with Battelle provides that any discoveries or inventions resulting from the survey are to become the property of the public.

RAILROAD ELECTRIFICATION

Is the electrification of railroads economically sound? The answer to this question is of interest to many industries. Coal groups, electrical manufacturers, and the Edison Electric Institute teamed up with seven eastern railroads in asking Battelle to explore the question.

After two years of study, the question has been answered in the affirmative. The report which has resulted, covers economic problems as well as the technical ones involved in expanding railroad electrification.

The study was made on the basis of rehabilitating a 400-mile section of road by means of modern steam, diesel-electric, and both 3000 volt d.c. and 24-kv, 60-cycle electric systems. The latter system, along with necessary apparatus, is a product of Battelle research. In this instance, the research engineers found that both electrical systems would save 17 to 25 per cent in operating costs and charges over diesel-electric locomotives. The 24-kv, 60-cycle system would provide an annual return of 8.33 per cent on the extra investment over the cost of modernization with diesel-electric. A large saving would also result as against modernization with steam.

Suggestions for added savings were also listed. These call for further study and are: a new principle of cab signalling; high frequency transmission of communications; a locomotive pantograph that would put less pressure against the contact wire, thus reducing the cost of the supporting structures; and the possibility of constructing new electric locomotives by using as many mass-produced parts of present diesel-electrics as possible.

One of the factors in favor of electrification is the rising cost of diesel fuel. Costs of diesel fuel increased 30 per cent faster than electric power from 1949-50.

The possibility that this difference will increase in the future could provide a large saving if railroads use electricity.

The report on "The Possibilities of Expansion of Railroad Electrification in the United States" may be obtained from Edison Electric Institute, 420 Lexington Avenue, New York 17, New York or Bituminous Coal Research, Inc., 2609 First National Bank Building, Pittsburgh 22, Pennsylvania. Price $1.

A LOW-TEMPERATURE RESIN-CLAY

Hobbyists may soon be able to get a ceramic-like material that they can bake in an ordinary oven. This is made possible by a Battelle-developed resin-bonded ceramic commonly known as a "Cerastic". "Cerastic" is a word coined by combining "ceramic" and "plastic". This new material permits the manufacturer, hobbyist, and industrial arts student to fashion a variety of articles by modeling, extrusion, dry pressing, or slip casting.

The ease of handling the material is illustrated by its use in slip casting. The resin-clay is run into plaster-of-Paris molds as a slurry. After the necessary setting period, articles may be removed from the molds and further dried at room temperature. The drying process may be speeded up by placing the articles in an oven for a short time at a temperature of 160° to 180°F. After drying, the material may be finished to a smooth, artistic surface and then baked at temperatures from 350° to 400°F. for an hour. The final step of coloring is done with synthetic lacquers. The finished products have a hard finish, and their weight is less than that of comparable ceramic articles.

BRIGHT FUTURE FOR FOOD

The world's food supply can be increased in two principal ways. We can add vast amounts by making better use of the knowledge we already have. We can also greatly expand the supply by using new food sources. This is the belief of Dr. K. Starr Chester, who recently addressed the Eleventh Annual Institute of Conservation, Nutrition, and Health which met in Chicago.

He pointed out that full use of pest control, irrigation, fertilizers, soil conditioners, and improved livestock diets would be a long step toward an abundant food supply. New techniques of converting sea water to fresh promise larger supplies of water for irrigation. Improvements in control methods are helping to cut down the 30 per cent food loss from pests. Large scale manufacture of soil conditioners will make it possible to increase production on inferior lands. And tested diets are pointing the way to cheaper feeding and faster growth of livestock.

"When we turn to unconventional foods," it was pointed out, "we find the means for increasing our food supply still greater."

Though half the world's food manufacture by plants occurs in the sea, we harvest only a fraction of it, mostly in the form of fish. Enormous amounts of minute plant plankton and larger seaweed and algae are produced. These can yield highly nutritious foods for man as well as animals.

Dr. Chester, who heads Battelle's research in the agricultural sciences, believes that we will eventually be able to produce food in factories in the same way that nature makes food in plants—by photosynthesis. When that day comes, we may look forward to unlimited food production.

LOW-TEMPERATURE METALS PROBLEM

There is an increasing need for metals for use at low temperatures. Many industrial operations are carried on at temperatures as low as —330°F. Military equipment must be designed for use in frigid sub-arctic regions. Equipment designed for release into the stratosphere must also be built for temperatures under —70°F.

Francis W. Boulger and Robert H. Frazier of Battelle discussed this problem at a symposium presented recently at Fort Belvoir, Virginia. They pointed out that laboratory tests are important in this field. Data on low-temperature properties of metals make it possible to predict how the metals will perform under service conditions.

Generally, reduced temperatures tend to increase the strength of metals. However, the same conditions decrease the toughness of such metals as molybdenum, tin, zinc, commercial titanium, and steel. The embrittling effects of notches or low temperatures on steels cannot be predicted accurately. Therefore, a steel's properties should be determined experimentally before it is used.

Steels for use at low temperatures need certain treatments and qualities. Rolling practice can improve low-temperature properties by affecting directionality and grain size. Thorough quenching is also desirable. Low-temperature steels need uniform microstructures, complete deoxidation, and fine ferritic grain sizes.

RECENT PAPERS BY THE RESEARCH STAFF*

Electron-Diffraction Study of Iron Carbides in Bainite and Tempered Martensite. A. E. Austin and C. M. Schwartz. American Society for Testing Materials, *Preprint* 165, 1952.

The Spectrum of Particle Size and Its Relation to Air Pollution. H. P. Munger. *Air Pollution: Proceedings of the United States Technical Conference on Air Pollution*, McGraw-Hill, 1952, pp. 159-166.

The chapters and authors listed below appear in *The Promise of Technology*, Volume IV of *Resources for Freedom*, a report to the President by the President's Materials Policy Commission. Published June, 1952. The chapter number is given with each chapter.

The Technology of Iron and Steel. C. E. Sims. Chapter 3, Part I.

The Technology of Iron Ore. B. D. Thomas. Chapter 3, Part II.

The Technology of Manganese. S. L. Case and J. W. Clegg. Chapter 4.

The Technology of Tin. B. W. Gonser. Chapter 5.

The Technology of Titanium. R. I. Jaffee and J. M. Blocher, Jr. Chapter 6.

The Technology of Zirconium. R. I. Jaffee and I. E. Campbell. Chapter 7.

The Technology of Uncommon Metals. B. W. Gonser and others. Chapter 8.

The Technology of Ocean Resources. Iver Igelsrud. Chapter 9.

*In most cases reprints will be available upon request to the Editor of the BATTELLE TECHNICAL REVIEW. Copies of THE PROMISE OF TECHNOLOGY may be obtained only from the Superintendent of Documents, United States Government Printing Office, Washington 25, D. C. Price $1.75.

A Word About Battelle Technical Review Abstracts

The abstracts that appear in the following pages are prepared from approximately 900 American and foreign technical journals, as well as from books and other literature received in the Battelle Library. Prepared by a professional staff trained in various technological fields, the abstracts are selected for their usefulness to the Battelle research staff. They are now being made available to technologists and scientists in industry and research in all parts of the world, through the pages of the *Battelle Technical Review*.

BATTELLE TECHNICAL REVIEW ABSTRACTS

SECTION INDEX

AGRICULTURAL RESEARCH 611a
Plant and animal nutrition; insecticides; fungicides; fertilizers; weed control; soils; etc.

ANALYSIS—CHEMICAL AND PHYSICAL 569a
Methods and apparatus for qualitative and quantitative determination of the composition of matter.

APPARATUS, METHODS, AND STANDARDS 574a
Industrial measurement, inspection, and control; laboratory equipment and procedures (except when auxiliary to other subjects); standards and specifications.

CERAMICS 586a
Abrasives; inorganic cements; glasses; ceramic coatings; structural clay products; refractories; whitewares.

CHEMICAL TECHNOLOGY 593a
Chemical engineering and process equipment; chemistry of materials such as wood, paper, textiles, and coal and petroleum by-products; petroleum refining.

CHEMISTRY—GENERAL, INORGANIC, AND PHYSICAL 597a

CHEMISTRY—ORGANIC 603a

CLEANING, FINISHING, AND COATINGS—METALLIC 557a
Buffing and polishing; chemical and electrochemical cleaning and coatings; diffusion, dip, oxide, sprayed, weld-deposited, and vapor-deposited coatings; cladding.

CORROSION 567a
Theory, measurement, and prevention (except by means of coatings).

DESIGN 590a
Design of parts, equipment, and structures (except when auxiliary to other subjects); theoretical stress analysis.

ELECTRICITY AND ELECTRONICS 623a
Electrical and electronic theory, circuits, equipment, and applications (except when auxiliary to other subjects).

FOUNDRY PRACTICE 544a
Melting; casting; pouring; rigging; shakeout and trimming; molding; core and pattern making; metallurgical control.

FUEL TECHNOLOGY 581a
Solid, liquid, and gaseous fuels—their properties and combustion; carbonization, liquefaction, and gasification of solid fuels; synthetic fuels. (For combustion in engines, see Section 21.)

GRAPHIC ARTS 627a
Printing and decorating processes, equipment, and materials; book manufacture; photography.

HEATING, DRYING, AND AIR CONDITIONING 583a
Space heating; cooling; humidification; materials drying and heating; equipment such as ovens, boilers, furnaces, heat pumps, and auxiliaries.

LUBRICATION AND FRICTION 589a
Lubricants and lubricating methods; friction fundamentals; nonmetallic bearing materials; oil filtration; lubricating-system design.

METALLOGRAPHY AND PRIMARY STRUCTURES 553a
Microscopy, diffraction methods and other techniques; phase diagrams; nuclear and crystal structures; microstructures; macrostructures. (For structures resulting from transformation or deformation see Sections 11 and 13, respectively.)

METALS—FABRICATION AND USES 580a
Miscellaneous fabrication procedures; applications of metals, alloys, and specific processes.

SECTION INDEX (Continued)

METALS—MECHANICAL PROPERTIES AND TESTS 559a
Elasticity and plasticity; stresses and stress analysis; fracture; creep; shear; hardness; fatigue; wear resistance; deformation structures.

METALS—PHYSICAL PROPERTIES AND TESTS 556a
Mass, thermal, thermodynamic, chemical, electrical, magnetic, and optical properties.

METALS—PRIMARY WORKING 546a
Preparation for working; forging; rolling; extrusion; swaging; tube making; wire and rod drawing; slitting, sawing, shearing, etc.

METALS—SECONDARY WORKING 547a
Drawing; impact extrusion; forming; stamping; machining and machinability; grinding; honing and lapping; strain hardening; shot peening; flame cutting.

METALS—SMELTING, REDUCTION, AND REFINING 542a
Smelting and reduction of ores; distillation of metals; electrolytic winning and refining; thermit processes; cementation; amalgamation; carbonyl, halide, and hydride processes; ingot practice.

METALS—THERMAL TREATMENT 550a
Homogenization; annealing; normalizing; patenting; quench, precipitation, and case hardening; tempering; stress relief; cold treatment; heating and cooling media. (For effects of thermal treatment, see Sections 11, 12, and 13.)

METALS—TRANSFORMATIONS AND RESULTING STRUCTURE 555a
Diffusion; nucleation and grain growth; recovery and recrystallization; allotropic transformations; precipitation; eutectoid reactions; other solid-state reactions; liquid-phase reactions; solid-liquid, vapor-solid, and vapor-liquid reactions.

METALS—WELDING OR JOINING 548a
Welding; soldering; brazing; weldability and weld tests; bonding metals to nonmetals; adhesive bonding; mechanical fastening.

MISCELLANEOUS 629a
Research and research organizations; general metallurgical articles; mathematics; medical research; patent law; other unclassified subjects.

ORE AND MATERIAL BENEFICIATION 541a
Preparation and concentration of solid materials; roasting; calcining; sintering; nodulizing; briquetting; mineralogy.

PAINTS, VARNISHES, LACQUERS, AND ENAMELS 610a
Organic and inorganic coatings (except ceramic coatings); their composition, properties, application, and testing.

PHYSICS 615a
Theory and practice (except as covered in other sections). Includes aerodynamics; biophysics; flow of gases and liquids; deformation of solids; heat transfer; nucleonics; semiconductivity and superconductivity; ultrasonics; etc.

PLASTICS AND HIGH POLYMERS 606a
Polymerization; properties; testing; processing methods and equipment; compounding. (Does not include rubbers and surface-coating resins.)

POLLUTION AND WASTES 580a
Sampling, analysis, collection, prevention, and treatment of gaseous and liquid wastes, including smoke, fumes, odors, fly ash, dusts, aerosols, sewage, and industrial wastes; by-product recovery; meteorological, topographical, and biological effects.

POWDER METALLURGY 548a
Powder production and properties; mixing; compacting; sintering; post-sintering operations.

PRIME MOVERS 584a
Reciprocating engines; turbines; jet engines; rockets; locomotives; auxiliary equipment; power from atomic fission.

RUBBERS AND OTHER ELASTOMERS 609a
Polymerization; properties; testing; processing methods and equipment; compounding.

STATISTICS AND ECONOMICS 628a
Natural resources; supplies; production and cost data; articles on economic trends.

BATTELLE TECHNICAL REVIEW

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ABSTRACTS†

August 1952

1. ORE AND MATERIAL BENEFICIATION

9894* Coal Preparation Plant of Old Sydney Collieries, Limited, Sydney Mines, C. B. J. A. Russell. *Canadian Mining and Metallurgical Bulletin*, v. 45, June 1952, p. 327-330; *Transactions of the Canadian Institute of Mining and Metallurgy*, v. 55, p. 213-216.

Describes new mechanical coal-loader which eliminates hand-loading while retaining the high quality of product produced by the latter technique. Graphs and diagrams.

9895* Progress in Coal Technology: Coal Preparation. E. Swartzman. *Canadian Mining and Metallurgical Bulletin*, v. 45, June 1952, p. 347-351; *Transactions of the Canadian Institute of Mining and Metallurgy*, v. 55, 1952, p. 223-237.

General discussion of coal preparation, stressing recent changes. 25 ref.

9896* Theory and Practice of Roasting Sulphide Concentrates With Special Reference to Canadian Gold Ores and Concentrates. L. E. Djingheuzian. *Canadian Mining and Metallurgical Bulletin*, v. 45, June 1952, p. 352-362; disc., p. 362-364; *Transactions of the Canadian Institute of Mining and Metallurgy*, v. 55, p. 238-248, disc., p. 248-250.

Reviews some Canadian papers and brings the information on Canadian roasting practices up to date. Also analyzes the mechanism of roasting.

9897 Work on Taconite Now Heads Toward Commercial Goal. A. H. Hubbell. *Engineering and Mining Journal*, v. 153, July 1952, p. 72-75.

Indicates that 1952 should see two more preliminary or experimental plants in operation with construction of two "ultimate" plants begun. Annual production should be at least 10,000,000 tons in 1960.

9898 How the Hollinger Mill Solves the Dust Control Problem. P. J. Dunlop. *Engineering and Mining Journal*, v. 153, July 1952, p. 79-82.

Illustrates and describes dust-control flowsheet superimposed on crushing-plant flowsheet, at Hollinger Consolidated Gold Mines, Ltd., Timmins, Ontario, Canada.

9899* Heavy-Media Separation; A Modern Mineral Dressing Process. S. A. Falconer. *Foote Prints*, v. 24, no. 1, 1952, p. 9-17.

Described and illustrated.

9900* Separation of Thorium From Monazite. S. R. Sivarajan. *Journal of the Indian Institute of Science*, v. 34, sec. A, Jan. 1952, p. 1-3.

Pure Travancore monazite freed from zircon, rutile, and siliceous impurities was used in the investigations. Results are charted.

9901* The Trend of Mineral Dressing in North America. *Bulletin of the Institution of Mining and Metallurgy*, June 1952; *Transactions*, v. 61, p. 9, 1951-52, p. 444-459.

Discussion of paper by M. G. Fleming, (Apr. 1952 issue.)

9902* Beneficiation of Low-Grade Chrome Ore From Dodkanya (Mysore.). P. I. A. Narayanan and G. P. Mathur. *Journal of Scientific & Industrial Research*, v. 11A, May 1952, p. 202-204.

Gravity methods of concentration were employed using the jig, Wilfley table, and Humphrey's spiral. Data tabulated.

9903* Beneficiation of Low-Grade Soft Chrome Ore From Kittaburu, Singhbhum District, Bihar. P. I. A. Narayanan and S. K. Banerjee. *Journal of Scientific & Industrial Research*, v. 11A, May 1952, p. 205-206.

Jigging, tabling, and Humphrey's spiral tests were employed. Data tabulated.

9904* Beneficiation of Low-Grade Hard Chrome Ore From Kittaburu, Singhbhum District, Bihar. P. I. A. Narayanan and M. C. Sen. *Journal of Scientific & Industrial Research*, v. 11A, May 1952, p. 207-209.

Jigging, tabling, Humphrey's spiral, and flotation tests were employed.

9905* Adsorption of Sodium Ion on Quartz. A. M. Gaudin, H. R. Spedden, and P. A. Laxen. *Mining Engineering*, v. 4, July 1952; *Transactions of the American Institute of Mining and Metallurgical Engineers*, v. 193, 1952, p. 693-696.

Describes in some detail results of experiments on the above in the development of flotation theory. Tables and graphs. 18 ref.

9906* The Effect of Certain Starches on Quartz and Hematite Suspensions. Strathmore R. B. Cooke, Norman F. Schulz, and Emert W. Lindroos. *Mining Engineering*, v. 4, July 1952; *Transactions of the American Institute of Mining and Metallurgical Engineers*, v. 193, 1952, p. 697-698.

In the discussion of the above the following are treated: test materials, starch adsorption on mineral surfaces, flocculation, and flotation.

9907* The Enrichment of Coal as a Factor Contributing to a Wider Base for the Coking Industry. (Russian.) Ia. M. Obukhovskii. *Ugol*, v. 27, June 1952, p. 31-32.

Discusses the increased activity in this field, particularly in the removal of sulfur for metallurgical coke. Data are tabulated.

9908* Pneumatic Beneficiation of Ural Brown Coal. (Russian.) Iu. N. Volkov. *Ugol*, v. 27, Feb. 1952, p. 33-36.

The production set-up and improvements achieved by the above are discussed. Data are tabulated and charted.

9909* Role of Kerosene in the Intensification of the Coal Flotation Process and Increased Quality of the Concentrate. (Russian.) D. S. Emel'ianov. *Ugol*, v. 27, Apr. 1952, p. 37-40.

The use of kerosene as a solvent for flotation oil was found to save oil as well as improve the concentrate and accelerate the process. Data are tabulated and charted.

†Prepared from books, journals, and other material received by the Battelle Memorial Institute Library.

1. *Ore and Material Beneficiation*

9910* Equipment for Drying Intermediate Products. (Russian.) N. S. Dukhan and M. V. Sitalo. *Za Ekonomiiu Topliva,* v. 9, Apr. 1952, p. 1-3.

Describes and discusses the use of centrifugal drying of intermediate products in coal washing and by-product coke plants. Operating data are tabulated.

9911* Experiments on the Beneficiability of the Antimony Ores of Oberböhmsdorf. (German.) Eugen von Szantho. *Zeitschrift für Erzbergau und Metallhüttenwesen,* v. 5, June 1952, p. 234-236.

Discusses flotation experiments which show that above ores can be easily floated to produce concentrates containing 60% Sb with better than 80% extraction. Includes photographs and tables.

Miscellaneous Publications

9912 Experimental Treatment of Barite Ores from Montgomery County, Ark., and Morgan County, Mo. D. W. Frommer and M. M. Fine. U. S. Bureau of Mines, Report of Investigations 4881, May 1952, 11 pages. (TN21 Un3r)

Laboratory mineral-dressing investigations described show that above ores are potential sources of barite and zinc. Fine grinding and froth flotation yielded drilling-grade barite from the former and chemical-grade barite and Zn concentrates from the latter.

9913 Concentration of Oxide Manganese Ores From the Vicinity of Cleveland, Bannock County, Idaho. K. C. Vincent and D. T. Holmes. U. S. Bureau of Mines, Report of Investigations 4884, May 1952, 14 pages. (TN21 Un3r)

Above ore proved readily amenable to heavy-medium separation to recover approximately 45% of the total Mn as a +51% Mn product. As the product was high in MnO_2 content and free from usual impurities, it might be acceptable as battery filler or for other special uses. Combined sink-and-float and tabling treatment recovered 51.8% of the Mn in a +48% product, marketable directly without sintering. Heavy-medium separation, supplemented by flotation of calcite from reground coarse reject and untreated undersize, recovered 70.1% of the total Mn in a combined product that, when sintered, assayed over 48% Mn.

Books

9914 Dana's Manual of Mineralogy. Ed. 16. Cornelius S. Hurlbut, Jr. 530 pages. 1952. John Wiley & Sons, New York. (QE363 D19m16)

9915 Lazarus Ercker's Treatise on Ores and Assaying. (Translated from the German Edition of 1580 by Anneliese Grunhaldt Sisco and Cyril Stanley Smith.) 360 pages. 1951. University of Chicago Press, Chicago, Ill. (TN664 Er22btr)

Lazarus Ercker's "Beschreibung allerfürnemisten mineralischen Ertzt unnd Bergkwercksarten" was the standard work on assaying for more than a century and a half. He emphasized the quantitative aspects of metallurgical reactions and was completely free of mysticism and alchemical hocus-pocus. Provides beautifully precise and detailed accounts of many chemical operations. Although not principally concerned with full-scale metallurgical operations, it contains excellent chapters on washing and amalgamation of gold ores and smelting of copper, lead, and tin; and it provides much information on iron, mercury, antimony, and other metals. More than 40 illustrations in this volume are reproductions of woodcuts in the German edition.

9916 Symposium on Bulk Sampling. 65 pages. 1952. American Society for Testing Materials, Philadelphia. (Special Technical Publication 114.) (TP325 Am35s)

Consists of Introduction, by W. Edwards Deming, plus 6 papers on specific aspects. Includes 2 on coal sampling and a joint discussion on this topic.

2. METALS—SMELTING, REDUCTION, AND REFINING

9917 Electrocapillary Phenomena at High Tempertures. (Russian.) O. A. Esin, Iu. P. Niktin, and S. I. Popel. *Doklady Akademii Nauk SSSR,* new ser., v. 83, Mar. 21, 1952, p. 431-434.

Experiments were made on metal-slag systems, involving a complex Al-Ca-Na silicate and Fe-C alloys containing 2.5, 3.0, and 4.0% C. Equipment is described and data are charted.

9918 The Preparation of Rare Earth Metals. F. H. Spedding and A. H. Daane. *Journal of the American Chemical Society,* v. 74, June 5, 1952, p. 2783-2785.

In order to prepare highly pure rare-earth metals, a technique was devised whereby rare-earth chlorides are reduced by Ca in Ta crucibles; the resulting rare-earth metal is vacuum cast in Ta containers. Sm, Eu, and Yb chlorides are reduced only to their stable divalent state and can thus be efficiently removed from rare-earth mixtures by such processing.

9919 Why Doesn't Somebody Make a Long, Thin Ingot? L. M. Long. *American Foundryman,* v. 21, June 1952, p. 53.

States that the average bronze ingot made today does not have the most efficient area-to-mass ratio for heat transference. Describes a different shape that in actual tests has reduced smelting time by an average of 14 min. per heat, with a proportionate savings in fuel and labor costs.

9920* The Effect of Basic Oxides on Desulfurization in Blast Furnaces. (German.) Bernhard Weilandt, Helmut Maetz, and Willy Oelsen. *Archiv für das Eisenhüttenwesen,* v. 23, May-June 1952, p. 163-172.

Discusses slag transformations in blast furnaces and the formation of Ca silicates. Experimental arrangement for desulfurization of pig iron is described, also the behavior of Mg, Ca, Sr, Ba, and Na metasilicates. The desulfurization effect of alkaline-earth oxides or Na oxides in clay silicates is indicated. Graphs. 33 ref.

9921* A Study of Tests for the Evaluation of Coke. R. W. Campbell. *Blast Furnace and Steel Plant,* v. 40, June 1952, p. 643-650; July 1952, p. 779-786, 800.

Presents results of the above based on tests of blast-furnace coke used currently by a number of manufacturers. Tables.

9922 Developing the Use of Coke Oven Gas in the Open Hearth Sparrows Point Plant of Bethlehem Steel Company. J. H. Kelley. *Blast Furnace and Steel Plant,* v. 40, July 1952, p. 773-778.

Describes how the change to firing high percentages of coke-oven gas in the openhearth increased production. Concludes that coke-oven gas can no longer be considered an inferior fuel, if supplied at the right pressure and used properly with a small amount of tar. Diagrams, tables, and charts.

9923* Free-Cutting Steel: Manufacturing Developments During the Last Thirty Years. James A. Anderson. *British Steelmaker,* v. 18, June 1952, p. 302-305, 310.

Sec. 1 gives experiences, 1920-1940, in development of above with special reference to machinability. Sec. 2 describes post-war development of a process for the manufacture of free-cutting steel with a 100% scrap charge, re-using the same Mn slag over and over again, and reducing the lime feed to negligible proportions.

9924* Relationship Between the Refining Process for Copper, and the Processing of Its Alloys. (French.) Marcel Cirou. *Fonderie,* May 1952, p. 2927-2937.

Discusses the above in the light of the following points: melting and refining of copper; physical and chemical reactions of refining; and processing of the principal Cu alloys. Tables, graphs, and photographs. 16 ref.

9925 High Pressure Shrink-Heads. (Czech.) Jan Kraus. *Hutnické Listy,* v. 7, Feb. 1952, p. 59-61; Mar. 1952, p. 124-128.

Refers to ingot casting of steel. A mixture of coke and limestone was used in the shrinkheads in order to develop higher pressure. The influence of size and shape of the shrinkhead on the shrinkage cavity was determined. Diagrams, graphs, tables, and macrographs.

9926 Alnico Recovery Process Salvages Valuable Nickel, Cobalt. Arant H. Sherman and Marvin Pesses. *Iron Age,* v. 170, July 3, 1952, p. 115-119.

Describes a practical method for recovery of the above waste

metal grindings and skimmings in manufacture of permanent magnets. Photographs.

9927 High Top Pressure: Further Operating Experience With Clyde No. 2 Furnace. R. P. Towndrow and W. Banks. *Iron & Steel*, v. 25, June 1952, p. 291-296.

A comparison of performance of a high-top-pressure furnace with a normal-pressure furnace at Clyde Iron Works. Gives details of furnaces and several methods for evaluation of operation. Graphs and tables.

9928 A New Method of Separating Eutectic Alloys. (Russian.) S. I. Drakin. *"Izvestiia Sektora Fiziko-Khimicheskogo Analiza"*, v. 20 (Academy of Sciences of the USSR), p. 341-344. (QD453 Ak13i)

Crystallization of binary alloys under the influence of an electrical current is proposed as a means of separating the components. Data are charted for Sn-Bi and Cd-Bi alloys.

9929 Oxygen in Steelmaking. D. J. Girardi and D. C. Hilty. *Journal of Metals*, v. 4, July 1952, p. 703-708.

A resumé of the more important points brought out by the various papers given at the Oxygen Symposium of the AIME Annual Meeting. Includes discussion of FeO in slags; distribution of Mn; O_2 equilibrium; Cr distribution; electrical conductivity; Si-O_2 equilibrium; the Fe-S-O system; metallic oxidation in Cr-steel melting; sampling and analysis for O_2; O_2 and air lancing. Numerous graphs.

9930 Physical Conditions in the Combustion and Smelting Zones of a Blast Furnace. J. F. Elliott, R. A. Buchanan, and J. B. Wagstaff. *Journal of Metals*, v. 4, July 1952; *Transactions of American Institute of Mining and Metallurgical Engineers*, v. 194, 1952, p. 709-717.

Describes the above by means of high speed photography through blast-furnace tuyeres. Numerous graphs and drawings.

9931 Distribution of Manganese and Oxygen Between Molten Iron and FeO-MnO-SiO_2 Slags. H. B. Bell, A. B. Murad, and P. T. Carter. *Journal of Metals*, v. 4, July 1952; *Transactions of American Institute of Mining and Metallurgical Engineers*, v. 194, 1952, p. 718-722.

The above distribution was determined and used to calculate activities of MnO and SiO_2 in MnO-SiO_2 slags. Graphs and diagrams. 14 ref.

9932 Thermodynamics of Iron-Silicate Slags: Slags Saturated With Solid Silica. E. J. Michal and R. Schuhmann, Jr. *Journal of Metals*, v. 4, July 1952; *Transactions of American Institute of Mining and Metallurgical Engineers*, v. 194, 1952, p. 723-728.

Experimental measurements are reported for the O_2 pressures of iron silicate slags in equilibrium with solid silica. Such slags have particular practical importance in copper smelting, in acid steelmaking, and in accounting for the service behavior of silica refractories. From the data, activity vs. composition relationships are calculated for O_2, FeO, and Fe. Tables and graphs.

9933 Chlorination of Zirconium Oxide. W. W. Stephens and H. L. Gilbert. *Journal of Metals*, v. 4, July 1952; *Transactions of American Institute of Mining and Metallurgical Engineers*, v. 194, 1952, p. 733-737.

Describes production of anhydrous $ZrCl_4$ required as a starting material in the Kroll process for production of ductile Zr. It is produced by direct chlorination of a ZrO_2-C mixture in a silica-brick-lined chlorinator. Theory and thermodynamics of reactions are discussed. A pilot-model chlorinator and full-scale production equipment are described and operating data are included. 10 ref.

9934* Rapid Method for Investigation of the Structure of Large Ingots by Means of Explosive Charges. (Italian.) Mario Signora and Giuseppe Testro. *Metallurgia Italiana*, v. 44, May 1952, p. 180-183.

Describes and illustrates test procedure. Gives results of a number of typical tests. Diagrams and macrographs.

9935* The Cominco Suspension Roasting Process. K. D. McBean. *Mining Congress Journal*, v. 38, June 1952, p. 36-39, 84.

Process developed by Consolidated Mining and Smelting Co. of Canada, Ltd., Trail, B. C., for recovery and utilization of waste SO_2 gases. Operating refinements and changes in design reviewed and evaluated in light of latest requirements. Application has been largely to the Zn-roasting process, although experiments indicate applicability to roasting of other mineral sulfides, such as Pb and Cu concentrates, Cu mattes, and Sb sulfides, with the production of gases rich in SO_2 and efficient recovery of waste heat from the gases. The process has also been successfully used for calcination, or reoxidation, of iron oxide catalyst and for decomposition of $MnSO_4$ by use of supplemental fuel.

9936* Effects of Blast-Furnace Operation on the Progress of Reactions in Basic-Bessemer-Steel Melts. (German.) Willy Oelsen and Erwin Eickworth. *Stahl und Eisen*, v. 72, May 22, 1952, p. 597-605.

Effect of progress of the decarburizing reaction on take-up of nitrogen of basic-Bessemer-steel melts. The manganese hump during decarburization as a characteristic feature of the reaction of carbon. Blowability of basic-Bessemer pig iron of different composition and temperature. Effect of blast-furnace operation on behavior of carbon during blowing. Extensive tabular and graphical data.

9937* Expriments on Use of Models for Devlopment of New Designs of Waste-Gas Pipe Bends Having Smaller Pressure Losses for Blast-Furnace Stoves. (German.) Walter Barth, Horst Kredel, and Eugen Laforsch. *Stahl und Eisen*, v. 72, May 22, 1952, p. 617-620.

Describes and diagrams experimental equipment and improved designs developed. Data are tabulated.

9938* Influence of Manufacturing Conditions in the Steel Plant on the Quality of Forging-Grade Steel Ingots. (German.) Werner Heischkeil. *Stahl und Eisen*, v. 72, June 5, 1952, p. 663-668.

Literature survey on defects in heavy forgings. Effects of Al additions, melting practice, and control of gas and air input in acid and basic openhearths. Effects of H_2 in steel. Pouring practice. Graphs.

9938a* Influence of Manufacturing Conditions on Properties of Large Forgings for Steam Turbines. (German.) Rudolf Schinn. *Stahl und Eisen*, v. 72, June 5, 1952, p. 676-683; disc., p. 683.

Influence of size of ingot, degree and kind of forging on properties. Significance of chemical composition. Heat treatment and quenching and resulting stresses. Mechanical and ultrasonic testing. Tables, diagrams, graphs, and micrographs. 31 ref.

9939 Blast Furnace Practice. (Concluded.) Beneficiation of Air.XI(d). Charles E. Agnew. *Steel*, v. 130, June 23, 1952. p. 82, 85-86, 89.

Describes how furnace-operating conditions can be created to permit use of oxygen-enriched air thereby increasing iron production with reduced blast and fuel.

9940* Dissociation of Zirconium Iodide on Hot Metal Surfaces. (German.) H. Döring and K. Molière. *Zeitschrift für Electrochemie; Berichte der Bunsengesellschaft für physikalische Chemie*, v. 56, Apr. 1952, p. 403-407; disc., p. 407-408.

Measurements of reaction rate of above dissociation by the method of van Arkel and de Boer. Characteristic curve of growth rate with wire and vessel temperature and formation of iodides of lower valence is discussed.

Miscellaneous Publications

9941 An Essential to Production of Well Purified Steel. C. Benedicks and H. Löfquist. Henry Brutcher, Translation 129 (Reissue), 15 pages. (From *Jernkontorets Annaler*, v. 117, no. 3, 1933, p. 151-164.)

Presents FeO-MnO-SiO_2 diagram from which slag compositions in equilibrium with steel having the desired Si and Mn contents may be read. A high Mn-Si ratio is said to be conducive to low-melting slag and to freedom from inclusions. Current deoxidizing practices using Mn data on practice aiming at high Mn content. Describes 3 steelmaking practices used commercially and giving a high-grade clean steel. Discusses rate of separation of MnO-rich slag from molten metal.

2. *Metals—Smelting, Reduction, and Refining*

9942 Use of Oxygen in Basic Open-Hearth Operation. K. Heinrich. Henry Brutcher, Translation 2847. (From *Stahl und Eisen*, v. 71, Nov. 8, 1951, p. 1199-1204.)

Previously abstracted from original.

9943 Electrolytic Manganese Tests in Cooperation With Industry. Frederick Sillers, Jr. U. S. Bureau of Mines, Report of Investigations 4861, May 1952, 81 pages. (TN21 Un3r)

To prove that electrolytic manganese from our low-grade domestic ores could be substituted satisfactorily for ferromanganese made from high-grade foreign ores, an extensive series of tests was conducted in cooperation with industry, in which electrolytic manganese produced by the Bureau of Mines at its Boulder City, Nev., Station was substituted for the ordinary ferro grades in the production of ferrous and nonferrous metals and alloys and welding-rod coatings. Over 1,200,000 lbs. of Mn was given out for this purpose. For some purposes electrolytic Mn was shown to be superior to other grades because of its high purity. Results of tests made in cooperation with industry (36 ferrous producers, 5 nonferrous producers, and 4 welding-rod producers) are extensively tabulated and discussed. 31 ref.

9944 The Conductivity of Some Molten Silicates on Fayalite Basis. (English.) G. Björling. *Kungl. Tekniska Högskolans Handlingar* (Transactions of the Royal Institute of Technology), no. 59, 1952, 29 pages. (T4 K96t)

Importance to electrochemical extraction of metals and ores of slag conductivities is pointed out. Conductivity of molten fayalite with different additions was measured from 1300-1400°C. to the temperature of initiation of crystallization. Additions were dicalcium silicate; monocalcium silicate (wollastonite); dizinc silicate (willemite); dimanganese silicate (tephroite); oxides of Ca, Al, Mg and Zn; magnetite; sulfides of heavy metals; and fluorspar. A theory is developed that only mobile cations can participate in the conduction, while the big anions lay practically immobile in the melt. 26 ref.

Books

9945 The All-Basic Open-Hearth Furnace. 92 pages. Apr. 1952. Iron and Steel Institute, 4 Grosvenor Gardens, London S. W. 1, England. (Special Report 46). (TN601 I6s)

Consists of 9 papers and accompanying discussion presented at 36th Steelmaking Conference, Ashorne Hill, Leamington Spa, May 2-3, 1951. Individual papers are separately abstracted.

See also:

9960 (ferrous melting operations)
9989 (steelmaking for large ingots)
10089 (sheet-steel manufacture for enameling)
10170 (degasification of molten metals)

3. FOUNDRY PRACTICE

9946 Standardizing Casting Practice. A. S. Grot and L. H. Carr. *American Foundryman*, v. 21, June 1952, p. 42-48.

Describes and illustrates successful control program of Edwards Valves, Inc., in connection with manufacture of steel valves for high-pressure service throughout a wide temperature range. Diagrams, macrographs, and photographs.

9947 Fool-Proof Sand Works For Wide Range of Castings. J. S. Schumacher. *American Foundryman*, v. 21, June 1952, p. 54-57.

Describes composition and characteristics of a foundry sand applicable to a wide range of casting sections. Graphs and tables.

9948* Oxygen in the Malleable Foundry. J. B. LaPota and L. H. DeWald. *American Foundryman*, v. 22, July 1952, p. 35-41.

Discusses merits of the above for better melting and annealing. Graphs and diagrams.

9949* Easier, Surer Identification With Colored Core Sands. L. C. Voss and W. W. Lynn. *American Foundryman*, v. 22, July 1952, p. 44-45.

Tells how to add small additions of organic dyestuff to core sands to lend a characteristic color. This aids in distinguishing one sand from the other, shows undermixing, prevents poor distribution or mixing of sand, indicates faulty core structure, and points out uncured cores. Photographs and tables.

9950 Large Parts, Intricate Shapes, Difficult Metals, are Possible With Skilled Investment Casting. D. F. B. Tedds. *American Machinist*, v. 96, July 7, 1952, p. 141-146.

Diagrams and illustrations show details of varied applications.

9951* Carbon Pick-Up. H. T. Angus. *British Cast Iron Research Association Journal of Research and Development*, v. 4, June 1952, p. 360-364.

In reference to iron castings, surveys and assesses relative value of various methods by which improved carbon pick-up has been attempted. Considers methods of raising and factors promoting carbon pick-up.

9952* Grain Size and Permeability of Foundry Sands. P. Jasson. *Engineers' Digest*, v. 13, June 1952, p. 194. (Translated and condensed from *Fonderie*, Feb. 1952, p. 2795-2804).

Previously abstracted from the original.

9953* Experimental Study on the Efficiency of Recirculation in Foundry Furnaces. Part One. (French.) M. Georges Ulmer. *Fonderie*, May 1952, p. 2917-2926.

Reports on experiments on an industrial scale for the purpose of gaining more exact data on the above. Experimental arrangement is described. Results and their interpretation are indicated. Tables, charts, diagrams, and photographs. (To be continued.)

9954 Plastics Remold the Foundry. Francis Bello. *Fortune*, v. 46, July 1952, p. 104-107, 140, 143.

Illustrated discussion of current status of the shell-molding process.

9955* Automatic Devices Facilitate British Foundry Operations. Vincent Delport. *Foundry*, v. 80, July 1952, p. 87-91.

Describes electrical units employed by Ferranti Ltd., of Great Britain for automatically adding inoculant to cupola Fe and for measuring the moisture content of holding sand. Photographs and circuit diagram.

9956* Investments for the Precision Casting Process. William F. Davenport and Adolph Strott, *Foundry*, v. 80, July 1952, p. 92-93, 192, 194, 196.

A study of the feasibility of using less critical materials for investments in precision casting work indicates that low-priced foundry sands can be used as the refractory. Satisfactory results were obtained employing such binders as phosphate salts, plaster, and alumina-base cement. Tables.

9957* Production of Aluminum-Nickel Bronze Sand Castings. Vincent De Pierre and Richard C. Wynne. *Foundry*, v. 80, July 1952, p. 94-97, 247-249.

Covers production practices employed at the U. S. Naval Gun Factory, Washington, for Al-Ni bronzes and castings. Also discusses properties of these castings. Diagrams, tables, and photographs.

9958* Modernized Foundry Boosts Castings Output. Robert H. Herrmann. *Foundry*, v. 80, July 1952, p. 100-105, 216, 218.

Tells how the Dodge Mfg. Corp., Mishawaka, Ind., manufacturer of power-transmission machinery, increased production 50% by rebuilding, redesigning, and mechanizing a section of its foundry. Illustrated.

9959* Effect of Blacking Additions to Core and Molding Sands. Theodore H. Burke. *Foundry*, v. 80, July 1952, p. 110-111, 234-235.

Studies of the above were conducted by the Worthington Corp., Buffalo, N. Y., to find a suitable but inexpensive material to incorporate in the core-sand mixture which would withstand the severe conditions imposed by the large volume of metal surrounding the cores. Tables, graphs, and photographs.

9960* Fuel and Metal. R. J. Sarjant. *Foundry Trade Journal*, v. 92, June 12 ,1952, p. 619-628.

Broad treatment of ferrous production and melting operations, stressing fuel and fuel requirements. Considers coke in metal

melting; coke shortages; contrast between cupola and blast-furnace requirements; constitution of coal; correlation of carbonizing conditions and coke properties; impact testing of coke; cupola flow and reactions; coke reactivity; the hot-blast cupola; and oxygen enrichment. 33 ref.

9961 Grain Refinement of Non-Ferrous Castings. G. Swinyard. *Foundry Trade Journal*, v. 92, June 19, 1952, p. 647-652.

Discusses advantages and disadvantages of a fine-grained structure; estimation of grain refinement; theory of concentration gradients; and nucleation in the melt. Discusses grain refinement of Al, Mg, and Cu and their alloys. 19 ref.

9962* Flow of Metal. *Foundry Trade Journal*, v. 92, June 28, 1952, p. 673-680.

Results of an experimental study, using motion-picture photography. Normal green-sand molds, open at the top, were used. 16 illustrations show frames from 10 series of shots representing different pouring situations.

9963* Gas Removal From Molten Aluminium Alloys. A. W. Brace. *Foundry Trade Journal*, v. 93, July 3, 1952, p. 3-11.

Begins by reviewing the work that has been done on the removal of dissolved gas, mainly H_2, from molten Al alloys. This is followed by a survey of the mechanism of gas absorption and removal, including sources of hydrogen, mechanism of absorption, factors affecting porosity and its distribution, and conditions for removal of gas from the melt. Application in production of castings under normal foundry conditions is discussed. Effect of chlorine and volatile chlorides on the soundness of castings was investigated. 23 ref.

9964* Knock-Off Feeding Heads. J. R. Robinson. *Foundry Trade Journal*, v. 93, July 3, 1952, p. 13-19.

Describes two practical methods of feeding castings. Use of exothermic core compounds, and use of the Connor block or hot lip-runner.

8965 The Effect of Metal/Mould Reaction on 85:5:5:5 Leaded Gun-Metal Sand Castings. N. B. Rutherford. *Journal of the Institute of Metals*, v. 80, June 1952, p. 555-568.

Refers to gas absorption and its effect on strength and pressure-tightness. Varying degrees of metal/mold reaction were induced in 85:5:5:5 leaded gun-metal by casting it into green-sand molds at 4 pouring temperatures between 1050 and 1200°C., and by varying the residual P content from 0.002 to 0.15%. Effect on the properties was determined from tensile test-pieces. The work was designed as a factorial experiment, and the results were examined by statistical methods. Some production trials are also reported together with notes on fracture and grain-size. Diagrams, graphs, and photographs. 19 ref.

9966 Shell Molded Stainless Valves and Fittings Now in Production. G. F. Sullivan. *Iron Age*, v. 169, June 26, 1952, p. 112-116.

Describes above at Cooper Alloy Foundry, Hillside, N. J. Increase in metal yield of 20-35% plus better tolerance, smoother finish, and cleaner working conditions are claimed. Types 304 and 316 stainless are used.

9967 An Exothermic Feeding Compound: Its Use With Steel Castings. E. Lazendorfer. *Iron & Steel*, v. 25, June 1952, p. 283-288.

Describes experiences with a Bitish material, Feedex, with the outstanding feature of being moldable and capable of fabrication into any desired shape. Marked reduction in riser size can be achieved by use of the material. Examples cover an unspecified steel, 12-14% Mn steel, high alloy Cr-Ni steel, and Mn bronze. Photographs, graphs, and micrographs.

9968* Improvement in the Preparation of Gadolinium-Magnesium Alloys. (French.) Francoise Gaume-Mahn. *Journal des Recherches du Centre National de la Recherche Scientifique*, Mar. 1952, p. 113-117.

Describes various methods for the above, such as fusion of Gd and Mg under pressure of an inert gas, replacing a halide of Gd by Mg, and new methods used in this investigation. Data are tabulated. 11 ref.

9969 Principles of Zone-Melting. W. G. Pfann. *Journal of Metals*, v. 4, July 1952; *Transactions of American Institute of Mining and Metallurgical Engineers*, v. 194, 1952, p. 747-753.

Consequences of the zone-melting manner of "freezing" are examined with respect to solute distribution in the ingot, with particular reference to purification and to prevention of segregation. Results are expressed in terms of the number, size, and direction of travel of the zones, the initial solute distribution, and the distribution coefficient confined to theory and procedures. Numerous graphs and diagrams.

9970 New Die Caster for Aluminium, Zinc, or Copper Alloys. *Light Metals*, v. 15, June 1952, p. 196.

Describes above machine which will cast Al, Zn or Cu alloys without the necessity of a major conversion. Other advantages are discussed. Chart of working data is given.

9971 Sand-Cast Beryllium-Bronze. L. Grand. *Metal Industry*, v. 80, June 13, 1952, p. 481-484, 489.

Discusses above giving information on composition; casting technique; and effects of impurities, Al, Be content, increasing tempering temperature, mold material, and mold arrangement on mechanical properties. Photomicrographs, photographs, and tables.

9972* Internal Stresses and Service Lift of Molds for Centrifugal Castings. (French.) Hans Bühler. *Métaux: Corrosion—Industries*, v. 27, Apr. 1952, p. 164-168.

Above relationship was investigated. Tables and graphs contain data on special low-alloy steels for such molds, and on factors affecting their service life.

9973* Fluidity of Binary Sn-Zn and Al-Zn Alloys. (French.) V. Kondic and T. P. Yao. *Revue de Métallurgie*, v. 49, May 1952, p. 321-326; disc., p. 326-327.

Reports on fluidity experiments on the above alloys, using mostly their eutectic compositions. Experimental arrangement is described; results are discussed. Diagrams, graphs, and micrographs.

9974 No Cure-All for Die Casters but Die Lubricants Smooth Performance. V. W. Smith. *Steel*, v. 130, June 30, 1952, p. 82, 84, 86.

Discusses the main purpose of the die lubricant—to prevent wear. Considers several specific lubricants.

9975 How Northrop Aircraft Vacuum Impregnates Metal Castings. Thomas A. Dickinson. *Steel*, v. 131, July 14, 1952, p. 88-90.

Describes specialized techniques adapted to impregnating Al and Cu alloys with Na silicate, vinyl lacquers, styrene, and phenol-formaldehyde resins. Photographs.

Miscellaneous Publications

9976 Basic Refractories For Cupola Service. M. W. Demlar. American Foundrymen's Society, Preprint 52-20, 1952, 4 pages. (TS200 Am35t)

Briefly reviews refractories used for acid practice as compared with those required for basic practice, and discusses the application of basic refractories for cupola linings.

9977 Report of Committee B-6 on Die-Cast Metals and Alloys. American Society for Testing Materials, Preprint 12, 1952, 7 pages. (TA401 Am35p)

Recommendations for changes in standards and specifications and discussion of paper by Babington and Kleppinger on Al die castings. (*American Society for Testing Materials, Proceedings*, v. 51, 1951, p. 169-193.)

9978 Nitrogen-Alloyed Cast High-Speed Steel. V. I. Prosvirin and I. F. Zudin. Henry Brutcher, Translation 2822, 7 pages. (From *Azot v Stali* (Nitrogen in Steel), Mashgiz, 1950, p. 161-168.)

Discusses best method of incorporating nitrogen into steel and maximum nitrogen content. Gives results of experimental study of effect on 2 high-speed steels. Describes specimen preparation, micrographic analysis, heat treatment, and effect of tempering temperature and number of draws on hardness. Gives data on cutting performance of N-alloyed cast tools as compared with forged tools. Describes casting procedure.

3. *Foundry Practice*

See also:
10247 (melting an Al-mischmetal alloy)
10589 (gas control from gray-iron foundries)
10709 (enamel-coated steel pipe for fluxing and degassing Al)
10790 (reduction of costs in die castings)
10791 (development of die-casting dies)
10854 (linseed oil as core binder.)

4. METALS—PRIMARY WORKING

9979* Conditions of Forming in Hot Deep Drawing. (German.) Dieter Lenz. *Archiv für das Eisenhüttenwesen*, v. 23, May-June 1952, p. 173-181.

Reviews problems of the above. Treats especially types of material used for hot deep drawing, tools and machinery needed, and various aspect of their production. Tables, charts, and macrographs. 17 ref.

9980* Crankshaft Forging; Details of the New R.R. Continuous Grain-Flow Process. *Australasian Engineer*, Apr. 7, 1952, p. 109, 111-113, 115, 117. (Based on article by J. M. Vialle and J. Lafont, *Métallurgie et la Construction Mécanique*, v. 83, Nov. 1951, p. 929-931, 933.)

Previously abstracted from original.

9981 Modern Research Practices in Rolling Mills. (Czech.) Eduard Krasmer. *Hutnické Listy*, v. 7, Apr. 1952, p. 182-186.

Discusses the above from the point of view of increasing production of rolled shapes. Extensive tabular data.

9982 New Tube Extrusion Process at Babcock and Wilcox Co. *Industrial Heating*, v. 19, June 1952, p. 998-1000, 1002, 1004, 1006, 1008, 1010, 1012, 1014, 1016.

See abstract of "Fiberglass Sheath the Secret: New Method Makes Stainless Extrusion Practical". *Steel*, v. 130, June 2, 1952, p. 92-96.

9983 Furnaces and Mechanical Equipment for Forging and Forming of Metals and Alloys. Hale A. Clark. *Industrial Heating*, v. 19, June 1952, p. 1026, 1028, 1030, 1032, 1034, 1036, 1038.

Discusses the art of forging and describes 3 methods of heating.

9984* New Tube Extrusion Process at Babcock & Wilcox Co. *Iron and Steel Engineer*, v. 29, June 1952, p. 106-110.

See abstract of "Fiberglass Sheath the Secret: New Method Makes Stainless Extrusion Practical". *Steel*, v. 130, June 2, 1952, p. 92-96.

9985* Titanium: Report on Cold Forming and General Machinability. James Joseph. *Machine and Tool Blue Book*, July 1952, p. 184-186, 188-190, 192-198, 200.

Conclusions based on work of North American Aviation, Los Angeles. Includes details of test results on a variety of operations.

9986 Forgeability, Machinability and Hardenability of Boron Carburizing Steels. S. L. Widring and Wilson T. Groves. *Metal Progress*, v. 67, June 1952, p. 71-76.

Gives details of experiences of Spicer Mfg. Div., Dana Corp., Toledo, Ohio, in use of modified boron steels for carburized gears and shafts. Data are charted and tabulated.

9987* Foreign, in Particular Swedish, Steel-Bar and Wire-Rod Rolling Mills. (German.) Theodor Dahl. *Stahl und Eisen*, v. 72, May 22, 1952, p. 605-611.

Swedish steel-bar rolling mills. Mill stands of special design. Roller guides. Mechanization of American steel-bar rolling mills. Morgoil bearings. Single drives in open finishing trains. American and Swedish wire-rod rolling mills. Prospects. Diagrams and illustrations.

9988* Deformation Conditions in Rail Rolling Using the Thyssen-Type Roll-Pass Design. (German.) Hellmuth Vollmacher. *Stahl und Eisen*, v. 72, May 22, 1952, p. 611-616.

Tells how to avoid cracks by a more thorough working of the material to be rolled in the axial direction of pressure by means of special processes and roll-pass designs. Comparison of the flow of material with the Thyssen-type roll-pass design and rolling processes used formerly. Influence of this design on strength properties of the rail foot.

9989* Steels for Large Forgings. (German.) Sepp Ammareller and Paul Grün. *Stahl und Eisen*, v. 72, June 5, 1952, p. 653-662; disc., p. 662.

Describes production, forging, and testing of large ingots. Inspection for surface-finish defects. Relationship of strength properties to those required in service. Alloy content of foreign and domestic steels. Tables and diagrams.

9990 An Examination of Modern Theories of Rolling in the Light of Rolling Mill Practice. (Continued.) W. H. Polakowski. *Sheet Metal Industries*, v. 29, July 1952, p. 581-586, 594.

Discussion includes: forward slip in rolling; effect of tension on forward slip; and relations between draft, forward, and backward slip. Data are given for carbon-steel strip. Diagrams and table. 12 ref. (To be continued.)

9991 Metal Cutting Temperatures and Tool Wear. Part I. A. O. Schmidt. *Tool Engineer*, v. 29, July 1952, p. 33-35.

Describes and diagrams thermocouple technique used for the above. Also discusses use of temperature-indicating colors. Graphs show variations of temperature of the tool tip with rake angle and feed for SAE-1055 and a Mg alloy. Temperature distribution in a single-point tool was also determined. (To be continued.)

9992* The Effect of Additions on the Extrudability of Cable Lead. (German.) Arnold Loeschmann. *Zeitschrift für Erzbergbau und Metallhüttenwesen*, v. 5, June 1952, p. 219-223.

Comparative experiments show that solid solution-forming elements (such as Sb and Sn) impede the recrystallization of cable lead less than highly dispersed insoluble additions (such as Cu, Te, Al, and Ca), and that solid solution-forming elements increase the required extrusion pressure, while soluble alloy additions have little effect on it. Diagrams, graphs, tables, and photographs.

Miscellaneous Publications

9993 The Ugine-Sejournet Extrusion Process. Jerome Strauss. American Iron and Steel Institute, Preprint, 1952, 15 pages. (TS300 Am35y)

Describes above process, developed by a French firm, for extrusion of complex shapes in ferrous and nonferrous metals and alloys. A glass-fiber sheath serves as the lubricant.

9994 Spread in the Hot Rolling of Steel. H. Bechmann. Henry Brutcher, Translation 2861, 4 pages. (From *Stahl und Eisen*, v. 70, no. 26, 1950, p. 1222-1223.)

Presents new approximation formula said to be more accurate than the proposed one by Tafel and Sedlaczek for the above. Includes diagram from which the ratio of spread to draft can be read without calculation.

9995 Powder Metallurgy vs. Drawn Wire Method of Producing Gears. John Rigby. *Metal Powder Association*, "Proceedings, Seventh Annual Meeting", 1951, p. 59-66; disc., p. 66-67. (TN695 M56p)

Points out that "all wire is not necessarily cylindrical". That is irregular shapes may be extruded, then sliced off to produce gears, etc. Describes procedures and equipment and discusses relative merits as compared with powder metallurgy. Illustrated.

Books

9996 Tube Producing Practice. 107 pages. 1951. American Institute of Mining and Metallurgical Engineers, New York. (Institute of Metals Div., Symposium Series, Vol. 4.) (TS280 Am35m)

The present volume conforms in general structure to its predecessors. There is an introductory paper which interprets the theory of tube-producing methods in terms of practical problems, followed by a number of papers on practices found in individual metal industries. The particular industries treated differ somewhat from those described in previous symposia. For the first time in the series, lead is discussed and the ferrous industry is described.

See also:
10055 (heat treating and forging of type 430 stainless)
10089 (sheet metal manufacture for enameling)
10109 (forming of Ti-O_2 alloys)
10265 (evaluation of steel forgings)

5. METALS—SECONDARY WORKING

9997 Die Quenching Precision-Forms Tough Alloys. Joseph S. Corral and Lyle R. Boarts. *American Machinist*, v. 96, July 7, 1952, p. 125-129.

Tells how 50-75% savings are being realized at North American Aviation in precision-forming high-strength Al alloys by a new manufacturing technique called form-die quenching. Straightening operations are eliminated and many "impossible" jobs now can be formed to precise limits in a single press operation.

9997a High Rake Angles Aid Milling Performance. Joe H. Crawford and M. Eugene Merchant. *American Machinist*, v. 96, July 7, 1952, p. 172-175.

Test results (shown graphically) indicate that HSS cutters give better performance by using rake angles of the order of 25-40°. Either a higher cutting speed for the same tool life, or a longer tool life for the same cutting speed, can be secured. Workpiece finish and accuracy are improved.

9998* Forces in Dry Surface Grinding. E. R. Marshall and M. C. Shaw. *Transactions of the American Society of Mechanical Engineers*, v. 74, Jan. 1952, p. 51-58; disc., p. 58-59.

Describes dynamometer for measuring independently normal and tangential forces in surface grinding. These forces are correlated with such variables as wheel speed, table speed, depth of cut, direction of table motion, grit material and size, specimen hardness, and dressing technique. X-ray diffraction methods are employed to study surface stresses and depth of cold work induced by grinding.

9999* The Size Effect in Metal Cutting. W. R. Backer, E. R. Marshall, and M. C. Shaw. *Transactions of the American Society of Mechanical Engineers*, v. 74, Jan. 1952, p. 61-71; disc., p. 71-72.

A cutting process involving formation of very small chips at high cutting speeds (micromilling) was investigated, and results are applied to a study of the grinding operation. Shear energy involved in grinding is compared with that in turning, micromilling, and the tensile test. 10 ref.

10000* Surface Temperatures in Grinding. J. O. Outwater and M. C. Shaw. *Transactions of the American Society of Mechanical Engineers*, v. 74, Jan. 1952, p. 73-81; disc., p. 81-86.

Heat-transfer theory involving a moving heat source is applied to the grinding process to obtain an equation for the mean surface temperature which predicts surface temperatures as high as 3000°F. for a representative fine-grinding operation. Representative values of mean temperature between the chip and grinding wheel obtained by the toolwork-thermocouple technique are presented and discussed. Role of the grinding atmosphere in production of sparks and in determining energy involved in grinding is illustrated by experimental data. Existence of high surface temperatures in fine-grinding operations is demonstrated by presence of a transformed surface layer that is largely retained austenite.

10001 Titanium Tests at High Temperatures. *Automotive Industries*, v. 107, July 1, 1952, p. 74, 82, 84, 94.

Results of tests on cold forming plus annealing, hot forming, scale removal, and spot welding. A basic aim was to determine the adaptability of the machines and procedures, used in forming stainless-steel components, to the forming of Ti parts.

10002 USAF Puts Its Money on "Big Squeeze". Irving Stone. *Aviation Week*, v. 57, July 7, 1952, p. 38, 40, 42, 46.

Air Force program on heavy presswork for more efficient aircraft production. 17 huge presses are to be made available to a series of companies during the next 2 yrs. Illustrated.

10003* The Effect of Diamond Wheel Grinding on the Surface Finish of Sintered Carbides. E. Dinglinger. *Engineers' Digest*, v. 13, June 1952, p. 189-193. (Translated and condensed from *Werkstattstechnik und Maschinenbau*, v. 42, Feb. 1952, p. 50-56.)

In order to reach sound conclusions from metal-cutting research, many variables, including tool angles, cutting speed, and feeds, cooling, and heating must be taken into account. An additional variable which, if not controlled, can completely vitiate research results, is keenness and surface finish of the cutting tool. This was first established in machining tests on wood, plastics, and other similar materials; it was also found that the optimum finish was not necessarily the finest. It appears that various materials require varying grades of tool finish for most satisfactory machining. Data tabulated and charted.

10004* The Theory of Plasticity Applied to a Problem of Machining. *Journal of Applied Mechanics*, v. 19 (*Transactions of the American Society of Mechanical Engineers*, v. 74), June 1952, p. 234-239.

Discussion, including authors' reply, of above paper by E. H. Lee and B. W. Shaffer (Dec. 1951 issue). Graphs and photomicrograph. 16 ref.

10005 Fast Cutting of Metal by Better Mechanical and Metallurgical Engineering. *Metal Progress*, v. 67, June 1952, p. 94-96, 120, 122.

Summary of proceedings of panel discussion of machinability. Among the topics were temperature effects; tool erosion by coolants; selection of carbide cutters and causes of their failure; microstructure vs. machinability; and "flame washing"—flame cleaning of castings.

10006 Hot Forming Aluminum Alloys. M. P. Meinel. *Product Engineering*, v. 23, July 1952, p. 163-165.

Discusses the need for hot forming of high-strength Al alloys; its effects on formability and mechanical properties; and selection of heating procedure.

10007* Machining Beryllium Copper. David Birch. *Screw Machine Engineering*, v. 13, July 1952, p. 49-51.

Discusses special problems involved. Set-ups are diagrammed.

10008 A Practical Approach to the Theory of the "Neutral Line". L. H. Park. *Sheet Metal Industries*, v. 29, July 1952, p. 597-599, 606.

Describes results of tests on the behavior of material during forming, to ascertain effects of plastic deformation of the crystals of which the steel is composed. Table and diagrams.

10009* The Influence of Thermal Deformation on the Precision of Metal-Cutting Machines. (Russian.) V. E. Smirnov and D. N. Reshetov. *Stanki i Instrument*, v. 23, Jan. 1952, p. 5-12.

Mathematical theory of the above is developed. Experimental data are charted, tabulated, and discussed.

10010* Scientific Research Work of ENIMS in 1951. (Russian.) A. A. Padogin. *Stanki i Instrument*, v. 23, Feb. 1952, p. 1-11.

This research included: automatization and mechanization of machines and production processes; investigation of operating processes on machines (shaping, dynamics of cutting, investigation of new methods of machining); study and determination of means of increasing strength and durability of machine parts, precision and economy of production and use of machines; investigation and development of modern construction of units and mechanisms; creation of basic machines; and preparation of proposed specifications and machine-building standards. Tables and graphs.

10011 Proper Cutting Fluids Can Step Up Machining. R. F. Huber. *Steel*, v. 130, June 23, 1952, p. 72-76.

Factors considered include the metal, the cutter, the specific operation, and choice of the proper cutting oil or coolant. Chart of recommendations for various steels; also several nonferrous metals and alloys. Photographs.

10012 Spark Machining: Meets Superalloy Challenge. Paul Porterfield. *Steel*, v. 131, July 7, 1952, p. 92-93.

Tells how refinement of equipment and techniques make spark machining a practical tool in the processing of hard-to-machine superalloys.

5. *Metals—Secondary Working*

10013 Production Cutting and Flame-Hardening. Archer B. Jones. *Welding Journal,* v. 31, June 1952, p. 469-474.

Examples of cutting and flame hardening in the manufacture of mining machinery, material handling, and conveying equipment at Jeffrey Mfg. Co., Columbus, Ohio. Illustrated.

10014* Shot Peening Cuts Drill Pipe Failures. Ralph Irving. *World Oil,* v. 135, July 1, 1952, p. 109-110.

Shop tests indicate life of equipment is extended by 4 times.

Books

10015 Protsess Obrazovaniia Poverkhnostogo Sloia pre Obrabotke Metallov Rezaniem. (Process of Surface-Layer Formation During Machining of Metals.) A. I. Isaev. 358 pages. 1950. State Scientific-Technical Publishing House for Machine-Construction Literature, Moscow, U.S.S.R. (TS213 Is1p)

Presents results of research by the Section on Machining of the Central Scientific Research Institute of Technology and Machine Construction on the process of surface-layer formation during machining. In particular, the relations between the microgeometry of the machined surface and the shape of the cutting tool in the zone of chip formation are discussed. Methods for selection of conditions necessary for production of a machined surface of given finish, such as rate of cutting, shape of the tools, cutting fluids, etc., are proposed.

See also:

9978 (cutting performance of N-alloyed cast tools)
9985 (machinability of Ti)
9986 (machinability of boron carburizing steels)
10017 (machining of sintered Fe)
10036 (machining nodular cast-iron welds)
10044 (gas and arc cutting of metals)
10050 (shot peening of springs)
10052 (thermal treatments vs. machinability of cast iron)
10055 (pressworking of type 430 stainless)
10109 (working of Ti-O_2 alloys)
10205 (gas cutting of new structural alloy steel)
10266 (wear resistance of steels and cast irons)
10772 (analysis of metal-forming problems)
10787 (machinability of ductile cast iron)

6. POWDER METALLURGY

10016 Hot Molding Increases Scope of Powder Metallurgy. Jerome F. Kuzmick. *American Machinist,* July 7, 1952, v. 96, p. 132-136. (Condensed from paper presented at 8th annual meeting, Metal Powder Association.)

The equipment used, some of the applications, and advantages and limitations of above process are described.

10017* The Effect of Grain Size of the Powder on Behavior of Sintered Iron During Nitriding. (German.) Werner Köster and Josef Raffelsieper. *Archiv für das Eisenhüttenwesen,* v. 23, May-June 1952, p. 225-228.

Effects of grain size on absorption of Ni on density, on rate of sintering and nitriding, and on nitriding temperature are indicated. Behavior of the sintered product during mechining, its corrosion resistance, and its hardness are discussed. Tables and graphs.

10018* Progress in Powder Metallurgy With Special Reference to High Temperature and Hard Metal Alloys. W. D. Jones. *Journal of the Chemical, Metallurgical & Mining Society of South Africa,* v. 52, Mar. 1952, p. 216-222.

Discusses mixing and milling; pressing; sintering; shaping; high-temperature alloys; porous metals and electrical applications; and powder manufacture.

10019 Some Notes on the Pressing of Powdered Materials. (Czech.) Curt Agte and Miroslav Petrdlik. *Hutnické Listy,* v. 7, Mar. 1952, p. 121-124; Apr. 1952, p. 190-194.

Discusses the theory and practice of the above. Presents tabular and graphical data on properties of a wide variety of powdered-metal combinations. Includes details of calculation procedures. 13 ref.

10020* Sintering of Silver Powder by Use of Silver Compounds. (German.) R. Palme. *Metall,* v. 6, July 1952, p. 369-371.

Reports on investigations aiming at diminishing the swelling of Ag sintered bodies caused by gas inclusions. Effects of an addition of 15 and 40% Ni, 2% graphite, or 6% CdO on density of the sintered bodies are charted.

10021* Technology of Prealloyed Stainless Steel Powders—Properties, Production, Uses. Part I. Arthur H. Grobe and George A. Roberts. *Precision Metal Molding,* v. 10, July 1952, p. 23-26, 67-70.

Describes growing interest in the use of prealloyed powders by the powder-metallurgy industry. Production methods are discussed and tables of properties are given. A large number of practical applications are cited. Diagrams and photographs.

Miscellaneous Publications

10022 The "Flywheel" Effect in Infiltrated Metal Powder Parts. George Stern. *Metal Powder Association,* "Proceedings Seventh Annual Meeting", 1951, p. 14-18; disc., p. 18-21. (TN695 M56p)

Iron skeletons, varying in density from 75 to 90%, were prepared from standard reduced Fe powder. The bars were pressed to approximately 70% density, sintered at 2100°F. for 1 hr. in cracked NH_3, then coined to densities between 75-90%. They were then infiltrated with Cu alloy to produce products varying from 85 to 100% of theoretical density. After identical heat treatment, effects of percentage infiltration on tensile strength, yield point, elongation, area reduction, and hardness were determined. Tables and graphs.

10023 A Metallographic Study of the Sintering of Brass Powders. C. J. Bier. *Metal Powder Association,* "Proceedings Seventh Annual Meeting", 1951, p. 49-56; disc., p. 56-58. (TN695 M56p)

Changes in microstructure which occur on sintering brass briquettes were studied. Effects of briquetting pressure, sintering temperature, and time in the hot zone were investigated. Charts and photomicrographs.

See also:

9995 (powder metallurgical production of gears)
10060 (production of Mo-Si sintered alloys)
10576 (metal powders in small-arms ammunition)

7. METALS—WELDING OR JOINING

10024* Automatic Argon-Arc Welding With Mechanical Feed of the Wire Electrode. (Russian.) A. Ia. Brodskii. *Avtogennoe Delo,* v. 23, Apr. 1952, p. 8-11.

Describes above equipment and discusses its use with 18-9 stainless-steel wire.

10025* Influence of Certain Structural Factors on the Operation of Injection Welding Torches. (Russian.) V. D. Nechaev. *Avtogennoe Delo,* v. 23, Apr. 1952, p. 11-15.

Presents a detailed discussion of the above. Data are tabulated.

10026* Recent French Developments in Lime-Ferritic Electrodes. *Foote Prints,* v. 24, no. 1, 1952, p. 19-22.

The information given is derived from a booklet published by Sarazin & Cie. one of the principal welding-electrode manufacturers in France.

10027 Seventeen Cr Stainless Replaces 18-8 in Many Weldments. *Iron Age.* G. E. Linnert, v. 169, June 26, 1952, p. 97-100; v. 170, July 3, 1952, p. 128-132.

Data presented in Part I show that 17-Cr steels properly handled show as good corrosion resistance as 18-8 in welded parts. Ferrite grain growth and martensite will reduce joint properties if allowed to form but both can be controlled. The Ti stabilized 17-Cr grade is easier to control when the right welding practice is used. Both 430 and 430-Ti show less distortion in welding than 18-8. Data in Part II show that gas-torch welding should not be used on Types 430 or 430T grades as grain growth and/or C pickup may occur. Shielded welding prevents loss of Ti on 430T. When using 430, preheating electrodes minimizes the pinhole conditions sometimes encountered. When spot welding cross-wire joints a mutual indention of 20-30% of the wire di-

ameter is used and proper current from 1-10 cycles is then selected. Tables and photomicrographs.

10028 Jet Engines Push Welded Molybdenum Study. Willard M. Boam. *Iron Age*, v. 170, July 10, 1952, p. 145-148.

Discusses weldability of Mo and some Mo-W, Mo-V, Mo-Ti, and Mo-Cb alloys. Information is given on effects of He-shielded tungsten electrodes on proper welding conditions, on the problem of securing ductile welds, and on effects of welding on mechanical properties. Photomicrographs and photographs.

10029* Step Welding of Toolsteels and of Certain Hardening and Tempering Structural Alloy Steels. (Swedish.) Tore Norén. *Jernkontorets Annaler*, v. 136, no. 4, 1952, p. 74-89.

By the aid of TTT diagrams for steels of high hardenability, it was found possible to calculate suitable welding conditions leading to decreased cracking tendency and to advantages from the point of view of heat treating. These principles were applied in developing the step-welding method. By this method, welding takes place after austenitizing the base material followed by quenching to a temperature, generally about 500°C., where transformation velocity is so low that the steel remains austenitic during welding. The steel is afterwards cooled and tempered, and heat treatment is adjusted to properties of the base material and the weld. Step welding may be applied to hard surfacing in general and also to the welding of slowly transforming structural steels. Graphs, table, micrographs, and photographs.

10030 Welding Tantalum. Adrian H. Daane. *Review of Scientific Instruments*, v. 23, May 1952, p. 245-246.

The above process is described in detail. Electrodes made of several materials were tested, including W, Ta, and graphite. Graphite gave the most stable and controllable arc. Diagrams.

10031* Argon-Arc Welding of Light Metals; Preparation for Their Welding by the Nertal Process. (French.) Charles Guinard. *Revue de l'Aluminium*, v. 29, May 1952, p. 207-213.

Reviews surface state, selection of welding rods, the various welding techniques, and edge preparation. Tables, graphs, macrographs, and illustrations.

10032* Influence of Welding Technology on the Construction of Building Elements in Ship Construction. (German.) H. Dohrmann. *Schweissen und Schneiden*, v. 4, June 1952, p. 187-194.

Describes the slow acceptance of welded structures in ship construction. The quality of riveted and welded elements is compared, the value of welded structural elements for the safety of the ship is indicated. Extensive diagrams and photographs.

10033* Practical Tests on Weldability and Resistance to Weld Cracking of Steel. (German.) W. Felix. *Schweizer Archiv für Angewandte Wissenschaft und Technik*, v. 18, May 1952, p. 152-159.

Describes details of such tests, especially weld-bend tests, the "Kinzel" test, and tear tests. Discusses weldability tests, and tests to determine hardening and brittleness in heat-affected weld zones. Application of results is indicated. Diagrams, tables, charts, micrographs, and macrographs.

10034 A Survey of Modern Theory on Welding and Weldability. (Continued.) D. Séférian. *Sheet Metal Industries*, v. 29, July 1952, p. 627-634, 642.

July installment considers: influence of type of electrode coating on mechanical properties of the weld metal, and related aspects including microstructure; influence of hydrogen on weld seams and in relation to various faults; and the Fe-H equilibrium. Tables, graphs, and photo-micrographs. 12 ref. (To be continued.)

10035* Relationship of Welding Current Strength to Translucency Factors in Welding Fluxes. (Dutch.) Th. Rosskopf. *Smit Mededelingen*, v. 7, Apr.-June 1952, p. 52-58.

Develops a formula for the most favorable ratio between translucency and welding current, from which optimum welding conditions and fluxes can be determined. Tables and graphs.

10036 Nodular Cast Iron Welds Hard to Machine. E. F. Davis and E. L. Layland. *Steel*, v. 130, June 23, 1952, p. 78-79.

Study shows that electric arc welds of one type of nodular cast iron approach the strength of the parent metal, but lack ductility, and are extremely hard to machine. Also indicates effects of preheating and post-annealing on mechanical properties and soundness of such welds joining nodular iron to itself, and to mild steel with two types of electrodes. Extensive tables of pertinent information.

10037 Titanium Alloys Flash Welded Easily. I. A. Oehler. *Steel*, v. 131, July 14, 1952, p. 84-85.

Briefly discusses above and states that satisfactory welds can be produced on conventional hydraulic machines if material is of uniform structure and if welded parts are annealed immediately after welding. Photographs.

10038* 1952 Product and Statistical Review Number. *Welding Engineer*, v. 37, mid-June 1952, 156 pages.

Includes: statistical review of the welding industry in 1951; product and literature review; product classification list; and trade name index.

10039 Characteristics of Submerged Arc Welding With Three-Phase Power. E. A. Clapp and N. G. Schreiner. *Welding Journal*, v. 31, June 1952, p. 479-485.

Shows that submerged-melt welding operating with 3-phase welding power applied to 2 welding rods arranged in close tandem so as to deposit weld metal into a common welding pool offers many advantages in some applications over other methods of submerged-arc welding. Illustrated by data on typical welds in steel plate.

10040 Hydrogen in Mild-Steel Weld Metal. A. L. Schaeffler, H. C. Campbell, and H. Thielsch. *Welding Journal*, v. 31, June 1952, p. 283s-309s.

Reviews of published and unpublished information on occurence and effects of H_2 in mild-steel weld deposits made by shielded-metal-arc welding with covered electrodes; H_2 in commercial electrodes; effects of H_2 on porosity, cracking, fish-eyes, and mechanical properties; welding considerations; practical applications, and engineering recommendations. Tables, graphs, diagrams, and macrographs. 183 ref.

10041 Brazing Hydromechanics. E. R. Funk and H. Udin. *Welding Journal*, v. 31, June 1952, p. 310s-316s.

Factors affecting rate of completion of a brazed joint are related to physical constants of the brazed metal, its surface tension, and joint dimensions. A study is presented of flow through two types of capillary dams. These considerations are modified to include the more practical case of fluxed joints. Effects on design for brazing are discussed.

10042 The Suitability of Various Steels for Flash Welding. Erick Hormann. *Welding Journal*, v. 31, June 1952, p. 318s-320s. (Translated and condensed from *Stahl und Eisen*, v. 72, Jan. 3, 1952, p. 19-24.)

Previously abstracted from original.

Miscellaneous Publications

10043 Fatigue and Static Tests of Flush-Riveted Joints. Darnley M. Howard and Frank C. Smith. National Advisory Committee for Aeronautics, Technical Note 2709, June 1952, 38 pages. (TL570 Un3t)

Fatigue tests at zero mean load were made on 190 multiple-rivet joints having ¾ in diam. Al7S-T3 100° countersunkhead rivets. Some of the joints had machine-countersunk holes and some had dimpled holes. The joints had 3 rivets at 1-in. pitch or 6 rivets at ½-in. pitch. Both butt and lap joints were tested. Static tests were made on 34 typical joints. The sheet materials used were 0.032-in. bare and Alclad 75S-T6, 0.032-in. bare and Alclad 24S-T3, and 0.064-in. Alclad 75S-T6. Apparatus described, diagrammed, and illustrated; results tabulated, graphed, and discussed.

Books

10044 Modern Welding Practice. Ed. 2. Andrew D. Althouse, Carl H. Turnquist, George E. Tabraham, and Burl E. Ott. 498 pages. 1951. Goodheart-Wilcox Co., Chicago. (TS227 AL79m2)

Nontechnical description of all types of gas and electric welding, heat treating, and metal cutting including submerged-arc and inert-gas welding, arc-oxygen cutting, underwater cutting and welding, stud welding, sprayed hard surfacing, welding tool and die steels, and power and flux cutting of high-alloy steels.

7. *Metals—Welding or Joining*

See also:
10001 (Ti welding tests)
10057 (welding of Cr-Mo steel pipe)
10205 (welds in new structural alloy steel)
10238 (welding of steel pipe)
10271 (welds in carbon and alloy steels)
10327 (welding of Al-alloy pipelines)
10513a (ultrasonic inspection of brazed circuit-breaker joints)
10571 (welding in clad-steel manufacture)
10572 (welding and brazing of Al radiators)
10574 (aluminum brazing sheet)
10802 (welded and riveted structures)
11409 (bonding metal-clad plastic laminates)
11413 (joining Al electrical conductors)

8. METALS—THERMAL TREATMENT

10045* Method of Determining the Regularity of the Change of Hardness and α-and γ-Phases of Steel During Heating to 1100°C. in a Vacuum. (Russian.) M. G. Lozinskii. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 1, 1952, p. 63-66.

Experiments were made on hot hardness of low-carbon steel. Equipment is described and data are charted.

10046* Impregnation of the Surface of Steel by Vanadium From Gaseous Media. (Russian.) G. N. Dubinin. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 11, 1952, p. 269-272.

Iron (0.03%C) and steel (0.1-1.2%C) were vanadium impregnated by means of VCl_3 vapor in a stream of H_2 at temperatures from 800 to 1300°C. Results are tabulated, charted, and illustrated.

10047* The Influence of Gas Adsorption on the Surface Hardening of Beryllium Bronze, Annealed After Hardening. (French.) Hubert Forestier and Joseph Maurer. *Comptes Rendus hebdomadaires des Seánces de l'Acádemie des Sciences*, v. 234, May 26, 1952, p. 2196-2198.

Results of experiments are charted and discussed. H_2, A, and CO_2 were used as atmospheres. Their adsorption on the surface of the crystal lattice caused a variation in rate of transformation of a nonequilibrium state, corresponding to precipitation in a supersaturated alloy after annealing.

10048 A Study of the Annealing Kinetics in Cold Worked Copper. Dwain Bowen, R. R. Eggleston, and R. H. Kropschot. *Journal of Applied Physics*, v. 23, June 1952, p. 630-634.

Resoftening kinetics for cold work in Cu were studied using residual resistance as a measure of degree of recovery. It was found that the resoftening could be represented by a single process of activation energy 28.3 kcal. per mole. The complete annealing kinetics are described by a 4th-order reaction. Graphs.

10049 Production Heat Treating of Connecting Rods. Herbert Chase. *Materials & Methods*, v. 35, June 1952, p. 100-101.

Describes how high output is maintained by using a continuous furnace, caustic soda quench, and recirculating draw furnace.

10050 Heat Treating, Setting and Shot-Peening of Mechanical Springs. F. P. Zimmerli. *Metal Progress*, v. 67, June 1952, p. 97-106.

2nd portion of 1951 William Park Woodside Lecture to Detroit Chapter, ASM. Data for both ferrous and nonferrous alloys. Tables, graphs, and diagrams.

10051 Migration of Copper Plating in Box Carburising. T. W. Ruffle and P. M. H. Chawner. *Metal Treatment and Drop Forging*, v. 19, June 1952, p. 245-250, 254.

Describes carburizing difficulties that arise near Cu-plated, "stopped-off" zones of steel components. Photographs and photomicrographs.

10052 The Annealing and Heat Treatment of Ductile Cast Iron. C. C. Hodgson, and W. Fairhurst. *Metallurgia*, v. 45, June 1952, p. 283-288, 296.

Results of an investigation undertaken to determine the relationship between thermal treatments applied to ductile cast iron and its structure and mechanical properties. The treatments concerned comprise annealing to improve machinability or develop maximum ductility and toughness, hardening, and tempering. Effects of Mn and Si content are also considered. Photomicrographs, diagrams, and tables.

10053* Contribution to the Study of Aging of Mild Steel. (French.) J. A. Lemoine and A. Sariban. *Revue de la Soudure; Lastijdschrift*, v. 8, no. 2, 1952, p. 84-104.

Discusses various aspects of the above, such as aging by cold-working, aging after quenching, and some experimental results. Tables contain results on cold-worked and quenched samples. Proposes a new method for measuring aging. 12 ref.

10054* Carburization and Decarburization of Steel in an Artificial Atmosphere. (Dutch.) C. H. Luiten. *Smit Mededelingen*, v. 7, Apr.-June 1952, p. 59-63.

Shows that above is governed by chemical reactions of gases around the steel, that rate control depends on the velocity of different gas reactions, and that "carbon pressure" is controlled by certain interdependent gas ratios. Includes graphs.

10055 High Chromium Stainless As A Substitute For 18-9. Part I. Heat Treating, Forging, Pressworking. Lester F. Spencer. *Steel Processing*, v. 38, June 1952, p. 288-294, 298.

Describes type 430 stainless steel, giving chemical composition, typical physical and mechanical properties; compares it with type 302 stainless. Detailed procedure for heat treating, forging, and pressworking of type 430 is given. Includes pickling and scale removal. Tables, photomicrographs. (To be continued.)

10056* The Thermal Effect of the Process of Natural Aging of Al-Cu Alloys (5%Cu) After Hardening and Recovery. (Russian.) S. M. Skuratov and N. S. Podol'skaia. *Zhurnal Obshchei Khimii*, v. 22 (84), Jan. 1952, p. 31-38.

The thermal effects were studied in a specially prepared alloy. Specimens were hardened at 19.2 and 26.0°C. Data are tabulated.

Miscellaneous Publications

10057 The Fabrication of Chromium-Molybdenum Steel Piping for 1000 to 1050°F. Central Station Service. R. W. Emerson. *American Society for Testing Materials, Proceedings*, v. 51, 1951, p. 869-887; disc., p. 887-894. (TA401 Am35p)

Certain metallurgical characteristics of the low-carbon Cr-Mo alloys are presented which indicate the possibilities of heat treating such material to a wide range of mechanical properties, depending upon the type of reat treatment specified. Discusses factors pertinent in heat treatment of alloy-steel piping to obtain good high-temperature properties. Several specific questions are raised relative to heat treatment for obtaining best high-temperature properties at 1000 and 1050°F. Data on the structural stability of the 2¼%-Cr. 1%-Mo alloy is presented together with impact-test data both before and after 2000 hrs. at 1050 and 1150°F. Data on the welding of this steel are also presented.

See also:
9938a (heat treatment of steel forgings)
9948 (use of O_2 in annealing malleable iron)
9978 (heat treatment of N-alloyed toolsteel)
10001 (Ti annealing tests)
10013 (flame hardening at Jeffrey Mfg. Co.)
10017 (nitriding of sintered Fe)
10029 (hardening and tempering of tool and alloy steels)
10044 (heat treatment of metals)
10109 (annealing of Ti-O_2 alloys)
10111 (Ti heat-treatment phenomena)
10127 (tempering vs. flakes in alloy steel)
10179 (heat treatment of permanent-magnet alloys)
10223 (heat treatment of wear-resistant castings)
10231 (heat treatment of low-carbon steel)
10248 (precipitation hardening of high-temperature materials)
10264 (heat treatment of high-speed steels)
10272 (strain and quench aging of steel)
10302 (annealing effects on creep of 2 S-O Al)

9. CLEANING, FINISHING, AND COATINGS—METALLIC

10058 How to Apply Metal to Glass and Ceramics. Samuel Wein. *American Machinist*, v. 96, July 7, 1952, p. 147-154.

Special report on procedures, equipment, and applications.

10059* Aspects of "Brightening" in Silver Baths. H. E. Arblaster. *Australasian Engineer*, Apr. 7, 1952, p. 73-75.

Discusses observations on the nature of the "bright" silver deposit; probable chemical compounds formed in cyanide plating baths; and electrolysis of NaCN plating solutions. 12 ref.

10060* Production of Materials Resistant To High Temperatures by Siliconizing of Tungsten and Molybdenum. (German.) Erick Fitzer. *Berg- und Hüttenmännisch Monatshefte der Montanistischen Hochschule in Leoben*, v. 97, May 1952, p. 81-90.

Describes the siliconizing of W and Mo wire. Their properties are indicated. Further describes production of Mo/Si alloys by means of powder metallurgy. Practical applications are outlined. Tables, micrographs, diagrams, and graphs. 21 ref.

10061 Effect of Addition Agents on Copper Deposition in a Convection-Free System. R. C. Turner and C. A. Winkler. *Canadian Journal of Chemistry*, v. 30, July 1952, p. 507-514.

Effects of gelatin and chloride ion on deposition in a convection-free system were similar in most respects to those observed when convection currents were present. Gelatin concentrations up to and including 250 mgm. per liter and chloride concentrations of 4 and 45 mgm. per liter had no effect on concentration polarization. 12 ref.

10062* Plating Powder Metal Compacts. *Electroplating and Metal Finishing*, v. 5, June 1952, p. 201.

Brief discussion of above problem. Plating before sintering and the avoidance of cyanide electrolytes are recommended. An example of Ni plating of Fe is given.

10063* Metal Spraying as a Marking Process. *Electroplating and Metal Finishing*, v. 5, June 1952, p. 207, 209. (Condensed from *Product Finishing*, Dec. 1951.)

Describes a number of applications of the above, chiefly for electrical-manufacturing purposes. Mentions a variety of metals used in spraying.

10064* P. R. Plating; An Assessment of the Present Position. *Electroplating and Metal Finishing*, v. 5, July 1952, p. 219-221.

10065* Sprayed Metal Coatings for the Protection of Steel Against Corrosion. J. C. Hudson. *Electroplating and Metal Finishing*, v. 5; *Metal Spraying*, v. 2, July 1952, p. 241-245, 247.

Discusses the performance of protective sprayed metal coatings in exposure tests, the value of thickness testing for specification purposes, and the painting of sprayed metallic coatings. Tables and graphs.

10066 Electrolytic Zinc Plating of Sheet Iron and Its Protection. (Czech.) Josef Teindl. *Hutnické Listy*, v. 7, Mar. 1952, p. 132-139.

Discusses the replacement of hot galvanizing by electrolytic Zn plating for sheet and strip. Proposes a method of preventing the formation of black spots on the inside of plated cans. Equipment diagrams. 14 ref.

10067 The Use of Aluminium Contacts in Electro-Polishing. H. J. Hartley. *Journal of Scientific Instruments*, v. 29, June 1952, p. 204.

Describes a method, using an insulating film of colloidal Al hydroxide on pure Al wire for establishing electrical contact without current leakage through the solution.

10068 Stainless-Clad Copper Promises Improved High-Temperature Service. *Machine Design*, v. 24, June 1952, p. 141-142.

Discusses "sandwiching" of Cu and steel for highest thermal conductivity of a heat-resisting material. Two outstanding benefits are the saving in weight and critical materials. An important application is in jet-aircraft engines.

10069 Electroplated Coatings on the Light Metals. Philip O'Keefe. *Materials & Methods*, v. 35, June 1952, p. 119-130.

The metals discussed are Al, Mg, and Ti. Covers surface preparation for plating; plating processes; properties of the electrodeposits; and applications of plated Al and Mg.

10070* Patent Law in the Metal Finishing Industry. Albert Woodruff Gray. *Metal Finishing*, v. 50, July 1952, p. 46-48.

Discusses the above, giving various examples of legal actions.

10071* A Metal Cleaning Test Using Radioactive Stearic Acid as Oil. J. W. Hensley, H. A. Skinner, and H. R. Suter. *Metal Finishing*, v. 50, July 1952, p. 49-52.

Procedures are given for producing a uniform, reproducible, abraded surface on steel test pieces, and for applying very thin, uniform, and highly reproducible films of tagged stearic acid to the surface of metal test discs. Descriptions are given of special apparatus used in preparation and coating of metal test pieces. Cleaning-test data are given showing removal from steel of stearic acid soil by single-component alkali solutions, with variation in cleaning time and solution concentration, and by one organic detergent solution, with variation in cleaning time. (To be concluded.)

10072* Chromium Plating With the Bornhauser Chrome Solution. Frank Taylor. *Metal Finishing*, v. 50, July 1952, p. 53-56, 64.

Developed primarily for direct Cr plating of Zn-base die-castings, above solution is characterized by the presence of sodium tetrachromate as a principal constituent and is operated at lower temperature and higher current density than the conventional bath. The deposit is dull and gray but it is soft and fairly easily polished to a luster approaching that of normal bright Cr. In comparison with conventional bright Cr-plating solution, throwing power and cathode efficiency are much better and soundness and corrosion resistance are superior.

10073 Production Plating of Aluminium. A. W. Wallbank. *Metal Industry*, v. 80, May 30, 1952, p. 442-443; disc., p. 443-444. (A condensation.)

Outlines recommended procedures. Composition and operating conditions of cleaning and plating solutions are tabulated. Metals plated are Zn, brass, and Ni.

10074* Measurements and Photographing of Anodically and Chemically Polished Pure Aluminum Surfaces. (German.) W. Helling and F. Baumann. *Metall*, v. 6, July 1952, p. 346-350.

Discusses measuring and presentation of the polishing effect. Details of the experiments are indicated. Diagrams, optical and electron micrographs, and interference patterns.

10075* Treatment of Zinc Waste in Hot-Dip Galvanizing. (German.) R. Haarmann. *Metall*, v. 6, July 1952, p. 363-369.

Discusses possibilities for economizing on Zn consumption in the above. Treatment of Zn residues, melting of Zn beads, treatment of slag, and of hard Zn are indicated. Graphs and micrographs.

10076* The Patent Literature in the Field of Anodic Oxidation of Aluminum. (German.) Max Schenk. *Metalloberfläche*, v. 4, sec. B, Mar. 1952, p. B43-B46; Apr. 1952, p. B59-B61; June 1952, p. B91-B92.

Includes tabular summary covering German, U. S., British, French, etc., patents.

10077* The Influence of Audible Sound and Ultrasonics on Electrochemical Processes. Part III. (German.) Albert Roll. *Metalloberfläche*, ser. B, v. 4, June 1952, p. B81-B89.

Discusses the electrolytic precipitation of metals by the effect of ultrasonics. Various experimental arrangements for this purpose are described. Precipitation of Ni, Cu, and Cr from solution is especially described. Superior mechanical properties (tensile strength and hardness) are shown to exist. Graphs and micrographs.

10078 Finishing Metal Parts for Telephones. F. B. Rinck. *Metal Progress*, v. 67, June 1952, p. 65-70.

Above involves plating and inorganic finishing of a wide variety of parts using 16 types of inorganic finishes and many

9. *Cleaning, Finishing, and Coatings—Metallic*

kinds of organic systems. Automatic equipment is used for Zn, Ni, Cu-Ni, Au, Ag, and Cu-Sn. Includes barrel-plating sections, cleaning, degreasing, passivation, etc. Main base metals are brass, steel, and Al.

10079 An Improved Cell for Electrolytic Polishing. L. W. Gleekman, G. E. Evans, and C. S. Grove, Jr. *Metal Progress*, v. 67, June 1952, p. 92-93.

Made from lucite tubing, closed with polystyrene plugs. Useful for acid electrolytes other than perchloric. In polishing of 14-carat gold, tests were run to determine effect on microstructure of such variables as electrolyte composition, cell voltage and current, previous mechanical polish, cathode-anode distance, rate of agitation, time of current flow, and cathode material.

10080 Hard Chromium Plate and Bright Plating of Steel or Die Castings. Allen G. Gray. *Metal Progress*, v. 67, June 1952, p. 77-78, 170, 172.

Reviews recent work on the above, including the self-regulating Cr-plating bath, properties of Cr plate, decorative uses, and Cr-plated die castings.

10081* Outlook for Tin Conservation. R. R. Hartwell. *Modern Packaging*, v. 25, June 1952, p. 136-139, 182, 185.

Directions of approach and technical limitations of further reductions in coatings are discussed. Describes experimental procedures and presents tabular and graphical data on performance of different types and thicknesses of tin coatings on cans used to store various types of food.

10082 Radiometric Determination of the Efficiency of Water Displacement From Phosphated Surfaces. Stanley L. Eisler. *Organic Finishing*, v. 13, June 1952, p. 19-21.

Gives experimental procedure for the above. Presents results of experiments on 10 different water-displacing, rust-preventive compounds on steel panels. Shows that one of the compounds which was very good when tested on sandblasted panels proved inferior when tested with phosphated panels. This demonstrates that it is not possible to extend results from one test condition to the other. It is recommended that all compounds be tested for their efficiency in displacing water from phosphated surfaces if it is planned to use them on such surfaces.

10083 Requirements of Clear Finishes for Chrome Plating. Arthur L. Phillips. *Organic Finishing*, v. 13, June 1952, p. 22-23, 27.

A two-coat, clear finish has been developed. Test results indicate that many of the problems of formulating a satisfactory organic coating for automotive Cr plating have been solved.

10084* Polarization and Overvoltage: Selected Bibliographical Abstracts. Ralph A. Schaefer and William King. *Plating*, v. 39, May 1942, p. 487-494; June 1952, p. 627-634; July 1952, p. 769-780.

American Electroplaters' Society Research Project No. 8. Article consists of brief foreword and introduction, and abstracts covering years 1875-1951. Latter were selected to include the important researches in the above field as they relate to electrodeposition and allied fields.

10085* Quantitative Measurement of Adhesion of Electrodeposited Metals. H. C. Schlaupitz and W. D. Robertson. *Plating*, v. 39, July 1952, p. 750-753, 764.

The problem of measuring adhesion is defined, certain tests that were proposed are evaluated, and a technique is demonstrated. Tables and diagrams. (To be continued.)

10086* Electropolishing of Al-Si-Fe for Micrographic Examinations. (French.) G. Meynet and A. Assibat. *Revue de l'Aluminium*, v. 29, May 1952, p. 180-182.

By cutting to a minimum the duration of electropolishing and by using an electrolyte composed of perchloric acid, ethyl alcohol, and butylcellosolve, electropolishing of light-alloys test samples containing Si was achieved without corrosion of the silicon lamellas.

10087* Chromium Plated Aluminum Engine Cylinders. Work of Mahle Firm. (French.) E. Meyer Rässler. *Revue de l'Aluminium*, v. 29, May 1952, p. 200-204.

Describes work of German firm on above. Micrographic studies of the Al-plated surfaces are described and illustrated. 10 ref.

10088* New Electropolishing Cell. Applicability to the Polishing of Cast Iron. (French.) André Roos. *Revue de Métallurgie*, v. 49, May 1952, p. 385-389; disc., p. 390.

Describes an electrolyte permitting very fast electropolishing of pearlite cast iron containing 2.61% C, 1.89% Si, 0.044 S, 0.14% P, 0.59% Mn, 0.05% Cr, and 0.21% Mo. The arrangement for electrolysis is diagrammed. Influence of the electrolyte, role of surface tension, and mechanism of polishing are indicated.

10089 Some Aspects of the Manufacture of Sheet Steel for Vitreous Enamelling. E. Marks. *Sheet Metal Industries*, v. 29, July 1952, p. 587-592.

Describes what recent changes in sheet maufacture mean to the enameler and explains why they result in a product more trouble-free in enameling. Photographs and graphs.

10090 The Mechanical Surface Finishing of Metals. (Continued.) G. T. Colegate. *Sheet Metal Industries*, v. 29, July 1952, p. 645-650.

This installment deals with polishing materials under the headings: methods of applying; choice of compound; binding media; and abrasives. Tables. (To be continued.)

10091 Hot Dip Aluminizing Affords Protective Surface. J. B. Russell. *Steel*, v. 131, July 14, 1952, p. 100, 102.

Describes above process. Coating applied by continuous process resists oxidation and scaling at elevated temperatures. Beryllium minimizes oxidation of bath and produces a high-luster surface. Discusses effects on mechanical properties.

10092* An Analysis of Metal Coatings. R. A. Schaus. *Western Metals*, v. 10, June 1952, p. 56-59.

Describes several processes which offer corrosion resistance to specific media and are applicable to a variety of shapes of steel articles. The principal metal coatings used are Zn, Sn, Pb, Cu, Cr, Si, Al, and stainless steel. Illustrated.

10093 Electrotinning Copper Wire: A New Process. Part I. The Process. Part II. The Machine. Frederick A. Lowenheim. *Wire and Wire Products*, v. 27, May 1952, p. 464-467, 506-507; June 1952, p. 565-568, 632-633.

Part I points out advantages over hot dipping, discusses types of baths, gives calculation methods. Gives details of the potassium stannate bath procedure. Also discusses sludge formation, type of deposit, rinsing, drag-out recovery, and ventilation. Part II presents a detailed account of the physical elements of a process for the continuous deposition of tin upon a moving copper strand.

10094* Coating Metal Used in Hot-Dip Galvanizing. Parts III-IV (Concluded.) Wallace G. Imhoff. *Wire and Wire Products*, v. 27, June 1952, p. 575-578, 630; July 1952, p. 686-689, 692.

Covers 3 classes of metals that are added to baths to achieve certain objectives in coatings. These are the very common metals such as Al, Sn, Sb, Cu, and Cd; various metals such as Ni, Cr, Mg, Bi, As, W, and alloys of Si and Mn; and mixtures of the above. July installment covers coating qualities resulting from different galvanizing-bath compositions.

10095* Interpretation of Etch Patterns in Etching and Chemical Polishing of Aluminium. (German.) A. Polityckí and H. Fischer. *Zeitschrift für Electrochemie; Berichte der Bunsengesellschaft für physikalische Chemie*, v. 56, Apr. 1952, p. 326-330; disc., p. 330.

Discusses the pattern caused by etching on aluminum. The reason for non-cubic patterns is indiacted. Micrographs.

Miscellaneous Publications

10096 Phosphate Coating as a Topochemical Reaction. A. Wüstefeld. Henry Brutcher, Translation 2785, 9 pages. (From *Archiv für Metallkunde*, v. 3, Jan. 1949, p. 43-45.)

Previously abstracted from original.

10097 The Physical and Chemical Changes Which Accompany the Polishing of Metals. A. J. W. Moore. *Journal of the Electrodepositors' Technical Society*, v. 28, 1952, 8 pages. (Advance Copy No. 1) TS670 E125j)

Discusses the above, considering especially the following topics: area of contact; temperature of sliding; surface damage; theory

of friction; properties of polished metal; mechanism of polishing; role of the abrasive; and structure of deformed layers. Includes micrographs.

10098 An Electron-Diffraction Investigation of the Structure of Electrodeposited Coatings on Iron Single Crystals. D. J. Evans and M. R. Hopkins. *Journal of the Electrodepositors' Technical Society*, v. 28, 1952, 10 pages. (Advance Copy No. 8) (TS670 E125j)

Describes experimental procedure and results obtained in deposition of Zn, Cu, and Ni on Fe single crystals.

10099 A Non-Electrolytic Smoothing Treatment for Steel. W. A. Marshall. *Journal of the Electrodepositors' Technical Society*, v. 28, 1952, p. 27-46. (Preprint.) (TS670 E125y)

It was found that aqueous solutions containing $H_2C_2O_4$, H_2O_2, and H_2SO_4 exert a pronounced smoothing action on ferrous alloys, producing with mold steel and whiteheart malleable cast iron, a considerable degree of polish. A suitable solution is described. Very strong adhesion of electrodeposited Ni to treated steel has been obtained, typical values being of the order of 50 tons per sq. in.

Books

10100 Handbuch der Metallbeizerei. Eisenwerkstoffe. (Handbook of Metal Etching. Ferrous Metals.) Ed. 2. Hermine Vogel and Alfred Keller, editors. 538 pages. 1951. Verlag Chemie, G.m.b.H., Weinheim-Bergstrasse, Germany. (TA462 V86h2)

A comprehensive treatise on etching and pickling of iron and steel, in theory and practice. Covers all chemical surface treatments. Numerous tables, graphs, diagrams, photomicrographs, footnote references, etc.

10101 Handbuch der Metallbeizerei. Nichteisenmetalle. (Handbook of Metal Etching. Nonferrous Metals.) Ed. 2. Hermine Vogel, editor. 410 pages. 1951. Verlag Chemie, G.m.b.H., Weinheim-Bergstrasse, Germany. (TA462 V86h2)

A comprehensive treatise on etching or pickling in theory and practice. Numerous tables, graphs, diagrams, photographs and footnote references.

See also:

10044 (hard surfacing of metals)
10055 (pickling and scale removal from type 430 stainless)
10184 (radiation from vapor-deposited coatings)
10189 (concentration polarization and deposition of metals)
10223 (abrasion-resistant surface deposits)
10559 (inspection of electroplated aircraft parts)
10571 (manufacture of clad steel)
10590 (disposal of plating and pickling wastes)
10879 (metal-cleaning agents)
11154a (Zn dust as protective pigment)
11423 (metal-on-glass electric resistors)

10. METALLOGRAPHY AND PRIMARY STRUCTURES

10102 Change of Coordination Number During Melting of Metals. (Russian.) O. Ia. Samoilov. *Doklady Akademii Nauk SSSR*, new ser., v. 83, Mar. 21, 1952, p. 447-450.

Previously published data are used for a theoretical discussion of the change of structures of metals as the melting point is approached. Data are tabulated and charted for a series of nonferrous metallic elements.

10103* Radiographic Investigation of Fracture Surfaces of Impact Specimens. (Russian.) M. P. Zheldak. *Doklady Akademii Nauk SSSR*, new ser., v. 83, Apr. 21, 1952, p. 843-845.

X-ray studies were made on fractured Mesanger specimens of highly alloyed, semiferritic steel, over a range from −20 to 100°C. Data are discussed. Includes diffraction patterns.

10104* The Iron-Phosphorus-Manganese System. (German.) Rudolf Vogel and Josef Berak. *Archiv für das Eisenhüttenwesen*, v. 23, May-June 1952, p. 217-223.

Proposes a phase diagram of the Fe-Fe_2P-Mn_2P-Mn system on the basis of thermal and structural investigations. Graphs and micrographs. 15 ref.

10105* A Method for the Electron and Optical Microscopic Examination of Identical Areas. E. D. Hyam and J. Nutting. *British Journal of Applied Physics*, v. 3, June 1952, p. 173-176.

A refinement of the usual stripping technique. An attachment is described which fits over the objective lens of a bench metallurgical microscope, and enables replica supporting grids to be precisely positioned over a feature of interest in the microstructure of a metal surface. Discusses operation and application. Apparatus drawings and micrographs.

10106 Micro-Analysis in Metallurgy; A Survey of German Investigations. *Chemical Age*, v. 66, June 7, 1952, p. 865-868.

Reviews recent German work on the above, using metallographic techniques.

10107* Theory of Order-Disorder Modifications in $AuCu_3$ Alloys. (French.) Gérard Fournet. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 234, May 19, 1952, p. 2049-2051.

Applies the Yvon theory to the above. Theoretical findings show satisfactory agreement with practical results. The method outlined for study of order-disorder transformations makes it possible to predict quantatively ordering phenomena at a small distance from experimental data for a large distance. Gives a new example of a relation between intensity of diffuse X-rays to energies of interaction between atoms. Experimental data for 400, 460, and 550°C. are tabulated.

10108 Comparison of Various Methods of Determining Austenitic Grain Sizes in Steel. (Czech.) F. Labonek and L. Jenicek. *Hutnické Listy*, v. 7, Apr. 1952, p. 171-178.

Presents a detailed discussion of the above. The "fracture grain size" method is recommended for general use, the Gerasimenko and Cu-diffusion methods should be used only for quality control, and the McQuaid-Ehn method should be used only for carburizing steels. 92 ref.

10109 The Structure and Some Properties of Titanium-Oxygen Alloys Containing 0-5 At.% Oxygen. A. E. Jenkins and H. W. Werner. *Journal of the Institute of Metals*, v. 80, Dec. 1951, p. 157-166.

By means of measurements of thermoelectric power at various temperatures and by quenching experiments on alloys made with refined Ti, limits of the $(\alpha+\beta)$ region up to 5 at.% O_2 were established. Alloys based on commercially pure Ti were also studied, and it was demonstrated that the impurities present in the commercial grade of metal cause a marked broadening of the $\alpha \rightleftarrows \beta$ transformation range. Mechanical working and annealing of commercially pure alloys were examined, and it was found possible to develop techniques for forging and swaging alloys containing as much as 3.5 at.% O_2. Alloys containing more than 1.5 at.% O_2 may be hot worked, but they are more or less brittle at normal temperatures. Factors affecting cold drawing and annealing of alloy wires were studied. Proof stress, nominal ultimate stress, plastic elongation, and hardness of annealed alloys were determined. 12 ref.

10110 The Sigma Phase in Binary Alloys of the Transition Elements. A. H. Sully. *Journal of the Institute of Metals*, v. 80, Dec. 1951, p. 173-179.

Appearance of above phase can be satisfactorily accounted for if it is assumed that incidence is determined by a critical excess of electrons in bond orbitals over vacancies in the 3d atomic orbitals. In alloys of Co and Fe with Cr; Fe, Ni, and Co with V; and Cr and V with Mn, predictions of the boundary of the homogeneous sigma-phase region made on the basis of this hypothesis agree well with experimental data where available. 28 ref.

10111 Titanium Alloy Development Mapped. W. Rostoker and H. D. Kessler. *Iron Age*, v. 169, June 19, 1952, p. 136-142.

Discusses above dealing chiefly with equilibrium phase relationships between Ti and other metals; kinetics of solid-state reactions; and heat-treatment phenomena. Information is given on a wide variety of alloys and systems of Ti. Phase and TTT diagrams, and photomicrographs. 12 ref.

10112 Borides of Some Transition Metals. Benjamin Post. *Journal of Chemical Physics*, v. 20, June 1952, p. 1050-1051.

Several unreported transition metal borides were prepared in a high-temperature investigation of several metal-C-B systems. Some structural characteristics of these new phases were deter-

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mined by means of an x-ray diffraction investigation of powdered samples.

10113 Observations on Nodular Graphite. H. M. Weld, R. L. Cunningham, and F. W. C. Boswell. *Journal of Metals*, v. 4, July 1952. *Transactions of American Institute of Mining and Metallurgical Engineers*, v. 194, 1952, p. 738-742.

Chemical analysis shows that the partition of the Mg addition between the metal and the graphite is independent of whether the graphite is in the form of nodules or flakes. The bright central spot observed in nodular-graphite polished sections is shown to be due to the structure of the nodules. Tables, diagrams, and electron micrographs. 13 ref.

10114 A Study of Grain Shape in an Aluminum Alloy and Other Applications of Steroscopic Microradiography. W. M. Williams and Cyril Stanley Smith. *Journal of Metals*, v. 4, July 1952; *Transactions of American Institute of Mining and Metallurgical Engineers*, v. 194, 1952, p. 755-765.

Introduces a new method of studying individual grains in alloys, which may find use in other metallurgical researches, and which seems also to be applicable to biological problems. Using stereoscopic microradiography, the shape of 91 contiguous grains in a worked and annealed Al-Sn alloy were analyzed and some topological quantities calculated. Diagrams, tables, micrographs, numerous excellent stereoscopic radiographs and drawings. 13 ref.

10115 Titanium Copper Binary Phase Diagram. A. Joukainen, N. J. Grant, and C. F. Floe. *Journal of Metals*, v. 4, July 1952; *Transactions of American Institute of Mining and Metallurgical Engineers*, v. 194, 1952, p. 766-770.

Methods used for determination of the above diagram include metallographic examination and x-ray and thermal analyses. The system was first worked out using high-purity sponge Ti and O_2-Cu. The high-Ti region was next determined more accurately using iodide Ti and vacuum-melted, O_2-free Cu. Graphs, photomicrographs and x-ray patterns.

10116* The Conception of Determination of Homogeneity. (German.) H. Franssen. *Metall*, v. 6, June 1952, p. 302-305.

Discusses theoretical considerations and methods of measurement of the above. Illustrated by measurements on different materials (porous, sintered lead bronze on an iron base; structural steel; carbonyl iron; Cu-Ni alloy; Bessemer steel; Cr-Mo Steel; and nonmetallics.) Tables and graphs.

10117* Investigations on Segregations in Superhard MgAl Malleable Alloys. (German.) W. Mannchen. *Metall*, v. 6, July 1952, p. 360-362.

Describes experiments for the above, containing 7% Al, 1% Zn, 0.1% Mn, in order to determine the percentage of segregations, their number, and their mean absolute surface. Results are tabulated and charted.

10118 Carbides in High Speed Steel—Their Nature and Quantity. Francis Kayser and Morris Cohen. *Metal Progress*, v. 67, June 1952, p. 79-85.

Each of 8 grades of high-speed steel was investigated for types of carbides present, volume and weight percentage, and transformations occurring during commercial austenitizing. Tables and graphs.

10119 X-Ray Studies of Metal Structures. W. H. Taylor. *Metal Treatment and Drop Forging*, v. 19, June 1952, p. 259-262.

Description of post-war research at Crystallographic Laboratory, Cambridge. Main topics are: x-ray microbeam technique; x-ray examination of modulated structures in alloys; alloys of Al with transition metals; and sigma-phase alloys. 41 ref.

10120 Crystal Structure of the Intermetallic Compound $Mg_{32}(Al,Zn)_{49}$ and Related Phases. Gunnar Bergman, John L. T. Waugh, and Linus Pauling. *Nature*, v. 169, June 21, 1952, p. 1057-1058.

A complete structure determination was made by the stochastic method. Verification of the structure with x-ray data was obtained from single crystals of the Mg-Al-Zn alloy.

10121* The Effect of Four Transition Metals on the α/β Brass Type of Equilibrium. J. B. Haworth and W. Rothery-Hume. *Philosophical Magazine*, ser. 7, v. 43, June 1952, p. 613-619.

Describes an experimental investigation of the effect of Mn, Fe, Co, and Ni on the α/β equilibrium in Cu-Zn and Cu-Al alloys at 672°C. For this purpose the isothermal sections of the ternary systems in the regions concerned were determined by annealing and microscopical examination. The bearing of the results on the theory of the transition metals and their alloys is discussed.

10122* Elementary Structure and Slip Band Formation in Aluminium. D. Kuhlmann-Wilsdorf. *Philosophical Magazine*, ser. 7, v. 43, June 1952, p. 632-644.

From electron micrographs of deformed high-purity Al, numerical estimates for spacing, length, and amount of glide of the individual elementary lines were obtained. The existing experimental evidence relating to the problem whether or not slip starts at the crystal surfaces is discussed. 25 ref.

10123* Quantitative Description of Crystal Structure by Means of Displacements. (German.) Albert Kochendörfer. *Zeitschrift für Electrochemie; Berichte der Bunsengesellschaft für physikalische Chemie*, v. 56, Apr. 1952, p. 283-294.

Describes displacements and their properties. The possibility of defining the structure of the real crystals by means of the displacements is indicated. Treats in particular grain and mosaic junction lines, displacements as a source of defects, and mosaic structure. Diagrams. 45 ref.

Miscellaneous Publications

10124 Report of Committee B-9 on Metal Powders and Metal Powder Products. American Society for Testing Materials, Preprint 15, 1952, 7 pages. (TA401 Am35p)

Consists largely of proposed tentative recommended practice for evaluating microstructure of apparent porosity in cemented carbides. Includes micrographs.

10125 Report of Committee E-4 on Metallography. American Society for Testing Materials, Preprint 53, 1952, 29 pages. (TA401 Am35p)

Consists largely of Subcommittee Report on electron microstructure of bainite in steel. Illustrated by 23 micrographs.

10126 Electron-Diffraction Study of Iron Carbide in Bainite and Tempered Martensite. A. E. Austin and C. M. Schwartz. American Society for Testing Materials, Preprint 165, 1952, 4 pages. (TA401 Am35p)

Samples of bainite and tempered martensite, etched to leave the carbide phases in relief ,were examined by electron diffraction. The steel was essentially plain carbon, of eutectoid composition. Cementite was found in samples isothermally transformed or quenched and tempered at or above 500°F. Both cementite and epsilon iron carbide exist at 500°F. In martensite tempered at 400°F., only epsilon iron carbide was found.

10127 Development of Flakes in Steel. S. S. Nosyreva. Henry Brutcher, Translation 2792, 4 pages. (From *Stal*, v. 8, no. 8, 1948, p. 753-754.)

Study of a 0.4%-C, 1.4%-Cr, 3.4%-Ni steel for influence of H_2 content on flaking. Experimental procedure. Results of metallographic analysis and impact tests on H_2-saturated and not-saturated specimens in as-quenched state and after tempering to various temperatures.

10128 Equilibrium Diagram of the Copper-Magnesium-Zinc System. (Russian.) V. I. Mikheeva and O. N. Kruikova. "Izvestiia Sektora Fiziko-Khimicheskogo Analiza", v. 20 (Academy of Sciences of the USSR), p. 76-93. (QD453 Ak13i)

Experimental data were obtained in order to construct the above diagram. Data are tabulated and charted. Includes 24 photomicrographs. 13 ref.

10129 Methods of Investigating the Structure of Metals With the Electron Microscope. (Russian.) D. S. Shraiber. "Izvestiia Sektora Fiziko-Khimicheskogo Analiza", v. 20 (Academy of Science of the USSR), p. 304-316. (QD453 Ak13i)

Construction and use of the electron microscope for metallographic studies is discussed. Various techniques are described. Includes several photomicrographs.

See also:
9934 (determining macrostructure of steel ingots)
9965 (grain size of 85:5:5:5 gun-metal)
9978 (microstructure of N-alloyed toolsteels)
10023 (sintered brass compacts)
10034 (microstructure of welds)
10052 (thermal treatment vs. structure of ductile cast iron)
10074 (polished Al surfaces—microstructure)
10087 (microstructure of Cr plating on Al)
10098 (structure of electrodeposits on Fe single crystals)
10136 (study of metallic surface structures)
10138 (Ni_2Al phase in Ni-Al alloys)
10139 (microstructure of 70:30 brass)
10144 (structures of Cr-Mn and Ni-V sigma phases)
10155 (solid solution of Mg in Al)
10186 (sulfur in liquid Fe)
10219 (microstructure of Al cast iron)
10227 (microstructure of Sn)
10240 (high-tensile β-brass—microstructure)
10241 (structure of Al-Zn-Mg bearing alloy)
10260 (microstructure vs. fatigue of metals)
10287 (microstructure of high-temperature sheet metals)
10307 (grain size of high-alloy austenite)
10312 (structure of sintered carbides)
10313 (Fe-Cr and Fe-Cr-Mn systems)
10314 (coarse-grained fracture in toolsteels.)

11. METALS—TRANSFORMATIONS AND RESULTING STRUCTURES

10130 The Stabilization of Austenite in Relation to the Martensite Transformation. (Russian.) G. N. Bogacheva and V. D. Sadovskii. *Doklady Akademii Nauk SSSR*, new ser., v. 83, Apr. 1, 1952, p. 569-572.

Experiments were made on the above by changing the rate of cooling the steel or by reheating slightly before the M_s point is reached. Data are charted for several high and low-alloy steels, including a 30.5%-Ni iron alloy.

10131 Growth of Spherical and Needle-Shaped Crystals of Binary Alloys. (Russian.) G. P. Ivantsov. *Doklady Akademii Nauk SSSR*, new ser., v. 83, Apr. 1, 1952, p. 573-576.

A mathematical analysis.

10132* Stress Fields Arising During Decomposition of Solid Solutions Near Spherical Nuclei of a New Phase. (Russian.) L. N. Aleksandrov and B. Ia. Luibov. *Doklady Akademii Nauk SSSR*, new ser., v. 83, Apr. 21, 1952, p. 833-835.

A theoretical discussion of the above with emphasis on the austenite-ferrite transformation of low-carbon steels.

10133* Problems of the Kinetics of Graphitization of Cast Iron. (Russian.) K. P. Bunin and I. V. Salli. *Doklady Akademii Nauk SSSR*, new ser., v. 83, Apr. 21, 1952, p. 841-842.

The formation of graphite in cast iron was studied by vacuum annealing at 950°C., and by microscopic examination. Data are discussed.

10134* Preparation of Bicrystalline Lead Plates. F. W. Brugman and T. J. Tiedema. *Applied Scientific Research*, v. 3, sec. A, no. 3, 1952, p. 250-252.

Describes a technique of preparing above which can be considered as a variation on the methods of Dunn and Tiedema for preparing crystals with a predetermined orientation by recrystallization of test pieces of solid metal.

10135* Initiation Period of the Austenite Transformation With Various Types of Cooling. (German.) Franz Wever and Otto Krisement. *Archiv für das Eisenhüttenwesen*, v. 23, May-June 1952, p. 229-237.

Discusses various methods for plotting the time-temperature-transformation diagram for above process. Various aspects of this diagram are indicated, and results for different types of steels are compared with experimental findings. Data are tabulated and charted. 10 ref.

10136* The Possibility of Utilizing Oxidation Coloring at Low Temperatures for Studying the Recrystallization of Iron. (French.) Jean Bardolle. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 234, May 26, 1952, p. 2200-2202.

Proposes use of films formed on polished metal surfaces during oxidation or sulfuration for surface investigations. Micrographs illustrate typical results.

10137 Thermoelastic Analysis of Transformations in Copper Alloys. R. Cabaret, P. Gence, L. Guillet, and R. Le Roux. *Journal of the Institute of Metals*, v. 80, Dec. 1951, p. 151-156.

Effect of allotropic transformations on elastic modulus and logarithmic decrement of Cu alloys was investigated. To determine these properties, a specimen was subjected to longitudinal vibrations of small amplitude and high frequency under reduced pressure. Formation of body-centered cubic phases on heating eutectoid Cu-Al and Cu-Sn alloys results in a marked decrease in elastic modulus, while the logarithmic decrement assumes large values before and during the transformation. Results are discussed in the light of present knowledge of the structure of alloys. 14 ref.

10138 The Formation of the Ni_2Al Phase in Nickel-Aluminium Alloys. R. W. Floyd. *Journal of the Institute of Metals*, v. 80, June 1952, p. 551-553.

Demonstrates that the Ni_2Al phase is the product of a peritectic reaction between the melt and the β(NiAl) phase. This was established by a comparison of the microstructures of small ingots of a series of binary NiAl alloys containing 20-30 at.% Al, with those of a corresponding series in which 2½ at.% of the Ni was replaced by Cr. Phase diagrams and photomicrographs.

10139 Segregation of Iron and Phosphorus at the Grain Boundaries in 70:30 Brass During Grain Growth. H. M. Miekk. *Journal of the Institute of Metals*, v. 80, June 1952, p. 569-576.

Data are given concerning: effects of P, of Fe, and of P+Fe on grain size and hardness; correlation between hardness and grain size ;and grain size vs. temperature for different critical amounts of P and Fe. A theoretical discussion is included. Graphs. 19 ref.

10140 On the Kinetics of Order in Ni_3Mn. Lewis R. Aronin. *Journal of Applied Physics*, v. 23, June 1952, p. 642-643.

A study of kinetic behavior in specimens initially cooled through the ordering range as a function of subsequent prolonged isothermal heat treatments. Room-temperature measurement of electrical resistivity and saturation induction gives evidence substantiating existence of ordered domains. Discusses anomalies, and dependence of equilibrium resistivity, and magnetic phenomena on domain growth. Graphs.

10141 Effect of Molybdenum and of Nickel on the Rate of Nucleation and the Rate of Growth of Pearlite. R. Wayne Parcel and Robert F. Mehl. *Journal of Metals*, v. 4, July 1952; *Transactions of American Institute of Mining and Metallurgical Engineers*, v. 194, 1952, p. 771-780.

Reports a systematic study of nucleation and growth for eutectoid alloy steels containing Mo and Ni. New data are presented on the effect of Mo on the interlamellar spacing of pearlite. Tables, graphs, and photomicrographs. 23 ref.

10142* Production of Nickel Carbide by Decomposition of n-Hexane on Metallic Nickel. A. Cimino and G. Parravano. *Journal of Physical Chemistry*, v. 56, June 1952, p. 706-707.

Additional data on the formation and properties of low temperature metal carbides. Graphs and tables.

10143* Measurement of Diffusion Layers in Iron by Means of Microhardness Testing. (German.) Ulrich Zwicker. *Metalloberfläche*, ser. A, v. 6, June 1952, p. A81-A87.

Shows how the depth of penetration of diffusion layers in Fe can be measured by microhardness testing. Method for interpreting the curves is indicated; various types of diffusion are compared. Some examples of the effect of alloys and of electrolytic intermediate layers are cited. Graphs.

10144 Transitions in the Chromium-Manganese and Nickel-Vanadium Sigma Phases. W. B. Pearson. *Nature*, v. 169, May 31, 1952, p. 934.

Brief note on above and on structures present above the transition temperature.

11. *Metals—Transformations and Resulting Structures*

10145* The Self-Perpetuating Step in Crystal Growth From the Melt. Bruce Chalmers and Ursula M. Martius. *Philosophical Magazine*, ser. 7, v. 43, June 1952, p. 686-687.

Discusses the general theory of crystal growth and the problem of nucleation of new layers on a growing crystal surface.

10146* X-Ray Study of the Transformation of 7%-Mg Al Alloys During Tempering. (French.) A. R. Weill. *Revue de Métallurgie*, v. 49, May 1952, p. 364-373.

Previously abstracted from *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 234, June 28, 1952, p. 523-525; disc., p. 525-526.

10147* Contribution to the Study of the Aging of Iron-Carbon Alloys by Measuring Their Electric Conductivities. (French.) H. J. Seemann and W. Dickenscheid. *Revue de Métallurgie*, v. 49, May 1952, p. 379-384.

Gives details of experiments on α-Fe alloys with carbon, using procedure recently described by Gruhl. Alloys containing 0.04 and 0.16% C were studied most thoroughly. Those containing 0.62 and 0.92% C were also investigated. Graphs and micrograph.

10148* Growth Spirals and Polytypism of Silicon Carbide Crystals. (English.) Ajit Ram Verma. *Zeitschrift für Electrochemie; Berichte der Bunsengesellschaft für physikalische Chemie*, v. 56, Apr. 1952, p. 268-274.

The different growth features observed on the faces of SiC crystals are illustrated and explained. These can be divided into growth spirals, which are of 3 types: elementary spirals; oriented overgrowths; holes, hollows, and spots. Illustrated. 10 ref.

10149* Nucleus Formation and Growth of Crystals in Solid Metals. (German.) W. G. Burgers. *Zeitschrift für Electrochemie; Berichte der Bunsengesellschaft für physikalische Chemie*, v. 56, Apr. 1952, p. 318-323.

Reports on results on experiments concerning nucleus formation and nature of the nuclei in recrystalization of deformed metal specimens. Reviews theoretical considerations on the basis of the literature. Micrographs and diagrams. 48 ref.

10150* Diffusion of Metals in Sintered Al Specimens. (German.) W. Seith and G. Löpmann. *Zeitschrift für Electrochemie; Berichte der Bunsengesellschaft für physikalische Chemie*, v. 56, Apr. 1952, p. 373-379; disc., p. 379.

Reports on investigation of a new Al sintered material "SAP"; and on diffusion of Ag, Cu, Mg, Si, and Zn in it. Also describes experiments in which the contacting surfaces were subjected to preliminary electrolytic oxidation. Micrographs.

10151* Investigations by Means of Radioactive Indicators of Exchange and Diffusion Processes in Silver Electrodes. (German.) Heinz Gerischer and Wolf Vielstich. *Zeitschrift für Electrochemie; Berichte der Bunsengesellschaft für physikalische Chemie*, v. 56, Apr. 1952, p. 380-386; disc., p. 386.

Reports on experiments on the exchange between Ag metal and Ag ions by means of Ag 110. The experimental arrangement is described. Results, based on kinetic analysis of the process, are indicated. Tables and graph.

Miscellaneous Publications

10152 Influence of Cobalt Upon Diffusion of Carbon in Austenite. M. E. Blanter. Henry Brutcher, Translation 2754, 6 pages. (From *Zhurnal Teckhnicheskoi Fiziki*, v. 20, Aug. 1950, p. 1001-1004.)

Points out lack of consistent data on effect of Co on diffusion coefficient of C in austenite and on heat of diffusion. Reports on systematic study. Gives composition of experimental alloys and concentration diagrams for diffusion at 1830 and 2190°F.; and calculated diffusion coefficients of C in Co-alloyed austenite (6, 11, and 31% Co.)

10153 Dilatometric Study of Crystal Growth at High Temperatures. Ya. I. Ol'shanskii. Henry Brutcher, Translation 2781, 6 pages. (From *Doklady Akademii Nauk SSSR*, new ser., v. 70, Feb. 1, 1950, p. 641-643.)

Previously abstracted from original.

10154 Recrystallization Kinetics of Alloyed Iron. L. I. Kogan and R. I. Entin. Henry Brutcher, Translation 2858, 8 pages. (From *Zhurnal Tekhnicheskoi Fiziki*, v. 20, May 1950, p. 629-632.)

X-ray study of recrystallization of Armco iron alloyed with ¼% Cr, Ni, W, Mo, Co, Si, and Mn. Preparation of samples; their treatment preparatory to study; x-ray technique used. Data on recrystallization kinetics of the various alloys prepared.

10155* Investigation of the Decomposition of the Solid Solution of Mg in Al. (Russian.) M. I. Zakharova and L. M. Baldina. "Uchenye Zapiski. Vypusk 134. Fizika. Kniga Piataia" (Scientfic Records. Vol. 134. Physics. Vol. 5), Lomonsov's Moscow State University, 1949, p. 100-106.

An x-ray study was made of the dependence of lattice constants of the 10%-Mg Al alloy on annealing time after various treatments. Data are tabulated.

10156* Investigation of the Phenomenon of Recovery of Duralumin During Aging. (Russian.) M. I. Zakharova and N. V. Lukovskaia. "Uchenye Zapiski. Vypusk 134. Fizika. Kniga Piataia", (Scientific Records. Vol. 134. Physics. Vol. 5), Lomonsov's Moscow State University, 1949, p. 107-112.

A study was made of hardness recovery in duralumin after various heat treatments. Data are tabulated.

See also:

10047 (transformation of Be bronze)
10111 (Ti solid-state reactions)
10118 (austenitizing transformations in toolsteels)
10121 (α-β equilibrium in brasses)
10217 (recrystallization of brasses)
10228 (recovery in Al-Ag alloys)
10238 (microstructure stability of steel)
10243 (structural changes in Al bronzes)
10246 (recrystallization of Al)
10296 (graphitization of low-alloy steels)

12. METALS—PHYSICAL PROPERTIES AND TESTS

10157* Solubility of Nitrogen in Iron-Chromium Alloys. (Russian.) K. T. Kurochkin, P. V. Gel'd, and V. I. Iavoiskii. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 11, 1952, p. 329-332.

A study was made of the above using alloys with 3.56-66% Cr and N_2 pressures of 512 and 735 mm. of Hg at temperatures of 1500 and 1670°C. Data are tabulated and charted.

10158 Certain New Laws Connecting Values of Losses to Coercive Force. (Russian.) N. S. Akulov and T. A. Elkina. *Doklady Akademii Nauk SSSR*, new ser., v. 83, Mar. 21, 1952, p. 377-379.

Presents a theoretical discussion of the above. Conclusions are confirmed by experimental data on cobalt, 45 and 78% Permalloys, Alsifer, and a steel of unspecified composition.

10159* Magnetization Curves of Plasticity Deformed Iron in Strong Fields. (Russian.) N. S. Akulov and K. M. Bol'shova. *Doklady Akademii Nauk SSSR*, new ser., v. 83, Apr. 21, 1952, p. 817-819.

Armco iron and an Fe alloy containing 4% Mo were used in experimental determination of the above. Data are charted.

10160* Ferromagnetic Resonance in Parallel Wires. (Russian.) V. K. Arkad'ev and A. G. Kotov. *Doklady Akademii Nauk SSSR*, new ser., v. 83, Apr. 21, 1952, p. 821-824.

Iron and nickel wires were used in investigation of the above. Data are charted.

10161* Interphase Tension at the Boundary of Unmixed Liquid Metals. (Russian.) P. V. Gel'd and S. K. Chuchmarev. *Doklady Akademii Nauk SSSR*, new ser., v. 83, Apr. 21, 1952, p. 877-880.

The interphase tension between molten Pb and Zn was measured experimentally. Data are tabulated and illustrated. 14 ref.

10162* The Heat Capacity of Nickel From 15 to 300°K.; Entropy and Free Energy Functions. R. H. Busey and W. F. Giauque. *Journal of the American Chemical Society*, v. 74, June 20, 1952, p. 3157-3158.

10163* Measurement of Instantaneous Induction Values and Field Strengths, and of Magnetic Reversal Losses, of Electrical Sheets. (German.) Willi Krug. *Archiv für das Eisenhüttenwesen*, v. 23, May-June 1952, p. 207-215.

Describes theoretical basis and construction of ferrometer, and its application to above measurements. The quality of the instrument is evaluated on the basis of the results. Graphs and diagrams.

10164* The Anisotropy of Electrical Resistivity of Cold-Drawn Wires of Some Cubic Metals and Alloys. T. Broom and W. K. Clothier. *Australian Journal of Scientific Research*, ser. A, v. 5, Mar. 1952, p. 119-127.

A special a.c. technique was devised to measure and compare the transverse resistivities of wires. In drawn wires of several metals and alloys, resistivities measured in the longitudinal and transverse directions are shown to differ. In Cu, longitudinal resistivity was slightly less than transverse, but in α-brass and α-Al bronze it was greater by about 3%. Suggests that an explanation may be found in terms of lattice disturbances associated with dislocations.

10165* On the Anisotropy of Electrical Resistivity of Deformed Cubic Metals and Alloys. T. Broom. *Australian Journal of Scientific Research*, ser. A, v. 5, Mar. 1952, p. 128-134.

Change of resistivity on annealing cold-rolled metals was found to depend on direction of measurement for Cu-Ni, steel, α-brass, and sterling silver, while no such variation was observed for Al, Cu, or Ni. An explanation of anisotropy both in strip and in wire is advanced in terms of lattice disturbances such as dislocations, vacant sites, and faults. Results are presented showing influences of deformation, recovery, and a second phase on anisotropy developed in brasses. 11 ref.

10166* The Sign of the Thermoelectric Electromotive Force of Silicon. (French.) Jean Savorninand France Fourrier-Savornin. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 234, May 26, 1952, p. 2165-2167.

Describes experimental arrangement leading to the finding that contrary to theoretical expectations, Si is thermoelectrically positive. Bismuth was found to be the most simple negative body.

10167* Magnetic Nickel-Iron Alloy. *Engineering*, v. 173, May 30, 1952, p. 691.

Briefly describes new British alloy Permalloy "F", in which a very rectangular hysteresis loop and a low value of coercive force are obtained by domain orientation. Graphs and tables.

10168 Specific Heat of Germanium Between 20°K and 200°K. I. Estermann and J. R. Weertman. *Journal of Chemical Physics*, v. 20, June 1952, p. 972-976.

High-precision measurements of the above were carried out between 20 and 200°K. 3 samples of Ge were investigated: an extremely pure sample, one of intermediate purity, and one with an addition of 0.006 at. % Al. Results are discussed. Graphs and tables.

10169* Sorption of Gases on Metal Powders and Subsequent Change in Metal Reactivity at Room Temperature. Hung Li Wang and Norman Hackerman. *Journal of Physical Chemistry*, v. 56, June 1952, p. 771-774.

The amounts of Cl_2, NO_2, O_2 and CO taken up by powders of stainless steel, Ni, and Mo were measured at room temperature. Reactivities of metal powders, in terms of H_2 evolution in dilute-acid solutions in the absence of air were determined for reduced stainless steel, Ni and Cr powders when they were bare, with CO adsorbed, or when covered with sorbed oxygen. Graphs and tables.

10170* Gases in Metals. (German.) P. Bardenheuer. *Metall*, v. 6, July 1952, p. 351-356.

Discusses the solubility of gases in metals, particularly the role of hydrogen. Gas absorption of metals, and effects of reaction gases, are indicated, as well as degasification of metal melts. Data are charted. 11 ref.

10171* Hall Effect of Iron and Nickel at Low Temperatures. (French.) J. P. Jan and H. M. Gijsman. *Physics*, v. 18, May 1952, p. 339-355.

Above was measured at 14, 20, 64, 83, and 293°K. Hall electric field per unit current density was plotted as a function of magnetic induction in the sample. "Extraordinary" Hall constant, as well as field parameter, were determined. Experiments shows that a new parameter, transverse electromagnetic conductivity, has a temperature variation simpler than the classical Hall constant. 16 ref.

10172* Scattering of Electrons in Metals by Dislocations. D. L. Dexter. *Physical Review*, ser. 2, v. 86, June 1, 1952, p. 770-774.

The problem of the change in electrical conductivity in metals upon cold-working is treated by the method of Koehler in which the scattering of electrons by pairs of parallel edge-type dislocations is assumed to be the major effect. A comparison is made between the electronic shielding used by Koehler and the shielding assumed by Landauer. The scattering matrix element is also evaluated, and anisotropy in the resistivity is discussed.

10173* Low Temperature Thermal Expansion of Uranium. Adam F. Schuch and Henry L. Laquer. *Physical Review*, ser. 2, v. 86, June 1, 1952, p. 803.

A study of the elastic constants of U. Graph.

10174* Magnetostrictive Vibration of Prolate Spheroids. Ni-Fe and Ni-Cu Alloys. J. S. Kouvelitest and L. W. McKeehan. *Physical Review*, ser. 2, v. 86, June 15, 1952, p. 898-904.

A study of different magnetic properties determined from the magnetostrictive vibrational behavior of small ferromagnetic prolate spheroids was extended to a large number of Ni-Fe (88, 84, 79, 68, 56, and 45 at.% Ni) and Ni-Cu (90, 84, 81, and 71 at.% Ni) alloys. Results are given for plain- and magnetic- annealed specimens. A 68%-Ni Permalloy was investigated in cold-worked, baked, and annealed conditions. Extends present information of ferromagnetics at low magnetizing fields. Graphs and tables. 11 ref.

10175* Radioactivities of Platinum and Iridium From Photonuclear Reactions in Platinum. Darleane Christian, Russel F. Mitchell, and Don S. Martin, Jr. *Physical Review*, ser. 2, v. 86, June 15, 1952, p. 946-950.

The products of photonuclear reactions induced in Pt by a 70-Mev. synchrotron x-ray beam was studied. No Os activities were found. The Ir fraction included 2 new isotopes. Relative yields of all radioactive isotopes were measured. Graphs. 14 ref.

10176* Comparison of Magnetoelastic Energy Losses and Magnetic Hysteresis in Ferromagnetic Materials. G. Bonfiglioli, A. Ferro, and G. Montalenti. *Physical Review*, ser. 2, v. 86, June 15, 1952, p. 959-961.

Compares values of losses in mechanical and magnetic hysteresis loops when the alteration (disregarding the sign) of domain structure produced by magnetic field or by mechanical stress is the same. Materials dealt with are: Ni, alloy steel, carbon steel, pure annealed iron, and Armco iron. Table and graphs. 10 ref.

10177 The Thermal Conductivity of Metals at Low Temperatures. I. The Elements of Groups 1, 2 and 3. II. The Transition Elements. K. Mendelssohn and H. M. Rosenberg. *Proceedings of the Physical Society*, v. 65, sec. A, June 1, 1952, p. 385-394.

In Part I, the thermal conductivity of Cu, Ag, Au, Mg, Cd, Al, In, and one polycrystalline and two single-crystal specimens of Zn were measured in the range 2-40°K. In Part II, thermal conductivity in the same range was measured for Ti, Mn, Fe, Ni, Zr, Cb, Mo, Rh, Pd, Ta, W, Ir, Pt, U, and for a Pb single crystal. As a rule, the metals of group 8 exhibited much higher conductivity than the metals of the lower groups. Numerous graphs. 10 ref.

10178 Low Remanence and the Temperature Variation of Permeability of Silicon Iron Alloys. E. W. Lee. *Proceedings of the Physical Society*, v. 65, sec. B, June 1, 1952, p. 455-456.

Observations suggest that the above properties of Si-Fe are closely connected and that both can be explained in terms of internal flux closure. Discusses measurements on alloys containing 0.9-14.0% Si.

10179 The Influence of Heat Treatment on Magnetic Viscosity in Permenent Magnet Alloys. R. Street, J. C. Woolley,

12. *Metals—Physical Properties and Tests*

and P. B. Smith. *Proceedings of the Physical Society*, v. 65, sec. B, June 1, 1952, p. 461-462.

Briefly discusses literature on the above. Graph shows results of measurements on Alnico specimens subjected to two different types of heat treatment.

10180 Universal Specimen Mount for Pole Figure Determination Using the Schulz-Decker Technique. D. N. Williams and D. S. Eppelsheimer. *Review of Scientific Instruments*, v. 23, May 1952, p. 229-231.

A universal specimen mount is developed for use with a Geiger counter-equipped x-ray unit to take advantage of the technique suggested by Schulz, Decker, Asp, and Harker. Sample pole figures of cold-rolled Ti and α-brass are presented.

10181 Permeameter for Elevated Temperature Tests. Robert H. Esling. *Review of Scientific Instruments*, v. 23, May 1952, p. 247-248.

The design and electrical circuit of the above apparatus for magnetic permeability testing are described. Three specimens of Type 416 stainless steel were prepared and tested; first, at room temperature (80°F.), then at 450°F.

10182* The Surface Condition of Copper Between 500 and 850°C. (German.) F. Erdmann-Jesnitzer and F. Günther. *Zeitschrift für Electrochemie; Berichte der Bunsengesellschaft für physikalische Chemie*, v. 56, Apr. 1952, p. 386-389; disc., p. 389-390.

Reports on experiments on the above. On the basis of the experiments, melting of surface layers 10^{-3} to 10^{-4} mm. thick, as described by K. Lichtenecker, is reconsidered.

10183* Energy Transmission Mechanism and Rate of Reaction on Metallic Surfaces. (German.) K. Schäfer. *Zeitschrift für Electrochemie; Berichte der Bunsengesellschaft für physikalische Chemie*, v. 56, Apr. 1952, p. 398-403.

Reports on experiments concerning the relationship between the energy-transmission mechanism to the adsorbed molecules, and their chemical reactions on the surfaces. The method of measurement is indicated, establishing the thermal accommodation coefficient of ethane on the metallic surfaces of Pt-Cu alloys. Results are interpreted; and an explanation of the phenomenon is proposed. Tables and graphs.

10184* Radiation From Freshly Vapor-Deposited Layers of Metals and Salts. (German.) H. Gobrecht and G. Barsch. *Zeitschrift für Physik*, v. 132, no. 2, 1952, p. 129-139.

Discusses experiments made with vapor-deposited Sb, Ag, Al, and Fe, also KCl, NaCl, and K_2SO_4 to investigate the cause of electron emission. Results indicate that oxidation and surface adsorption are the causes of radiation; and that edges, scratches, variations in layer thickness, undercoating, and centers of metal formation influence rate of reaction.

Miscellaneous Publications

10185 Progress in Metallurgy. B. A. Rogers and F. H. Spedding. "Annual Review of Nuclear Science. Vol. I. (Annual Reviews, Stanford, Calif.), p. 441-464. (QC780 An78)

Reviews effect of nuclear irradiation on properties of metals, new measurements on physical properties of thorium and uranium, data on alloys and compounds of thorium and uranium, application of radioisotopes to metallurgical investigations, newly published information on 3 metals of interest in reactor design, reports on liquid metals that may be usable in heat exchangers. 66 ref.

10186 Influence of Carbon Upon Activity of Sulfur Dissolved in Liquid Iron. A. M. Samarin and L. A. Shvartsman. Henry Brutcher, Translation 2756, 8 pages. (From *Izvestiia Akademii Nauk SSSR*, Section of Technical Sciences, Mar. 1951, p. 407-410.)

Previously abstracted from original.

10187 Electrical Potential Differences and Their Origin. J. A. V. Butler. "Electrical Phenomena at Interfaces" (Macmillan Co., New York), 1951, p. 1-29. (QC609 B97e)

A fundamental discussion, with extensive references to the literature. Includes section on electrode potentials of metals. 30 ref.

10188 Overpotential. J. O'M. Bockris. "Electrical Phenomena at Interfaces" (Macmillan Co., New York), 1951, p. 155-189. (QC609 B97e)

A fundamental discussion, with extensive references to the literature. 142 ref.

10189 Concentration Polarisation and the Deposition of Metals. J. A. V. Butler. "Electrical Phenomena at Interfaces" (Macmillan Co., New York), 1951, p. 190-203. (QC609 B97e)

A fundamental discussion, with extensive literature references. 52 ref.

10190 The Behaviour of Oxygen and Hydrogen at Electrodes. J. A. V. Butler. "Electrical Phenomena at Interfaces" (Macmillan Co., New York), 1951, p. 204-228. (QC609 B97e)

A fundamental discussion under the following headings: adsorption of oxygen at anodes, electrolytic behavior of hydrogen, and formation of oxide films on noble metals. 138 ref.

10191 Fluidity of Ferrous Alloys. (Russian.) N. N. Kurnakov and M. Ia. Troneva. "Izvestiia Sektora Fiziko-Khimicheskogo Analiza", v. 20 (Academy of Sciences of the USSR), p. 66-75. (QD453 Ak13i)

A study was made of fluidity in the Fe-Si, Fe-P, and Fe-Cr systems. Data are tabulated and charted. 37 ref.

10192* Investigation of the Hysteresis Loop of Deformed Nickel at Low Temperatures. (Russian.) M. A. Grabovskii. "Uchenye Zapiski. Vypusk 134. Fizika. Kniga Piataia" (Scientific Records. Vol. 134. Physics. Vol. 5), Lomonsov's Moscow State University, 1949, p. 31-55.

An extensive study was made of the above. The Ni was deformed by tension, torsion, and bending. Magnetic properties were determined with respect to extent of deformation and to testing temperature. Test data are charted. 35 ref.

10193* The Equivalent Action of a Circular Magnetic Field and the Drawing Load on the Longitudinal Magnetisation of Nickel Wire. (Russian.) M. A. Grabovskii and G. M. Liakov. "Uchenye Zapiski. Vpusk 134. Fizika. Kniga Piataia" (Scientific Records. Vol. 134. Physics. Vol. 5), Lomonsov's Moscow State University, 1949, p. 56-62.

A study was made of the magnetic anisotropy of Ni wire and its causes. The interrelationship of natural magnetic anisotropy and of anisotropy induced by external forces was determined. Data are charted. 20 ref.

10194* Investigation of Certain Rapid Processes in Iron During an Aperiodic Change of the Field. (Russian.) R. V. Telesnin. "Uchenye Zapiski. Vypush 134. Fizika. Kniga Piataia" (Scientific Records. Vol. 134. Physics. Vol. 5), Lomonsov's Moscow State University, 1949, p. 63-92.

A study was made of the rate of magnetization and of demagnetization of iron in toroids, wires, and foils. Hysteresis loops for various conditions are presented. 26 ref.

10195* Eddy Currents in Non-Magnetic, Metallic Cylinders and Plates. (Russian.) R. V. Telesnin. "Uchenye Zapiski. Vypusk 134. Fizika. Kniga Piataia" (Scientific Records. Vol. 134. Physics. Vol. 5), Lomonsov's Moscow State University, 1949, p. 93-99.

Presents a theoretical discussion of the above; also results of experiments on Cu, Al, brass, and Zn specimens.

10196* Investigation of the Heat Capacity of Low Melting Metals in the Solid and Liquid States. (Russian.) G. M. Bartenev. "Uchenye Zapiski. Vypusk 134. Fizika. Kniga Piataia" (Scientific Records. Vol. 134. Physics. Vol. 5), Lomonsov's Moscow State University, 1949, p. 113-125.

An experimental study was made of the above for Sn and Pb of high purity. Data are tabulated and charted. 37 ref.

10197* Heat Capacity of Tin and Lead Alloys. (Russian.) G. M. Bartenev. "Uchenye Zapiski. Vypusk 134. Fizika. Kniga Piataia" (Scientific Records. Vol. 134. Physics. Vol. 5), Lomonsov's Moscow State University, 1949, p. 126-133.

Three Pb-Sn alloys were investigated; 38% Pb-62%Sn; 72.4% Pb-27.6% Sn; and 89.9% Pb-10.1 Sn. Data are charted.

See also:
10017 (density of sintered Fe)
10019 (sintered alloy combination)

10021 (prealloyed stainless steel powders)
10055 (physical properties of type 430 stainless)
10140 (physical properties of Ni_3Mn)
10147 (electrical conductivity of Fe-C alloys)
10204 (thermal conductivity of cast Al alloys)
10219 (physical properties of Al cast iron)
10242 (physical properties of plastics, rubbers, and metals)
10249 (measuring surface tension of solids)
10272 (strain aging vs. physical properties of steel)
10298 (electrical conductivity of Be-Cu wire)
10330 (potentials of stainless steels and other alloys)
10502 (Bi as thermocouple material)
10558 (measuring interphase tensions: molten metal/slag)
10569 (physical properties of stainless steel)
10742 (catalytic effect of metals on lubricant oxidation)
10787 (ductile cast iron-properties)
11335 (magnetic resonance of H_2 absorbed on Pd)
11357 (ferromagnetic resonance in Mn Sb)
11361 (absorption of X-rays by Pb, Cu, and Al)
11363 (gamma-ray absorption coefficients)
11414 (impurities vs. electrical properties of Al in capacitors)
11423 (electrical properties of metal films)
11437 (high permeability Ni-Fe alloy)
11475 (fine-wire resistors)
11479 (specific heat and thermal conductivity of Mg)

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10198* More Thoughts on Fatigue. P. Litherland Teed. *Aeroplane*, v. 82, June 27, 1952, p. 787-790.

Suggest some interesting methods for increasing the fatigue life of aircraft structures. They include development and exploration of residual stresses and mechanical production of surface compressive stresses. Data are tabulated. 18 ref.

10199* Pre-Tensioning for Preventing Fatigue Failure in Bolts: Simple Theory and an Account of Experiments Carried Out at the R.A.E. W. A. P. Fisher, R. H. Cross, and G. M. Norris. *Aircraft Engineering*, v. 24, June 1952, p. 160-163.

Gives a simple elastic theory of reduction of bolt-load fluctation obtained by deliberate pre-tensioning and describes some fatigue tests which establish the principle. The form of joint considered is that for which tensile load is transmitted from one member to another through an axially-loaded bolt. Experimental results are given for ¾ in. steel bolts tested in steel and in Al-alloy fittings. Tables, graphs, and photographs.

10200 Thermodynamic Considerations in the Resistance to Plastic Deformation of Two-Phase Metallic Alloys. (Russian.) K. A. Osipov and B. P. Stoiukhim. *Doklady Akademii Nauk SSSR*, new ser., v. 83, Mar. 21, 1952, p. 439-442.

Theoretical, mathematical analysis.

10201* Evolution of Heat During Plastic Deformation. (Russian.) N. S. Fastor. *Doklady Akademii Nauk SSSR*, new ser., v. 83, Apr. 21, 1952, p. 851-855.

Presents a mathematical discussion of the above in relation to type of deformation (tension or torsion.) By means of the equations derived, energy converted to heat, energy due to residual stress, and energy due to work hardening may be calculated.

10202* The Influence of Cracks on the Mechanical Properties of Materials in Various Stress States. (Russian.) Ia. B. Fridman, T. K. Zilova, and N. I. Zhukova. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 1, 1952, p. 67-70.

Various combinations of torsion, tension, and compression (in sequence) were used in tests on hardened-steel specimens. Data are charted. Macrographs illustrate fractured pieces.

10203* Influence of Surface-Active Materials on Plastic Flow of Polycrystalline Metals. (Russian.) T. A. Amfiteatrova and B. Ia. Iampol'skii. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 11, 1952, p. 305-308.

Experiments with Al and Cu wires were made during the above study. Various alcohols, sodium dioctyl-sulfosuccinate, and butylstearate, were used as the surface-active agents. Data are charted.

10204* Research on Cast Aluminum Alloys for Cylinder Heads. (German.) H. Vosskühler. *Aluminium*, v. 28, Apr. 1952, p. 99-106.

Describes high-temperature tensile and creep tests on a series of 18 Al alloys, compositions of which are tabulated. The one found to be best is called "Hy-511". It contains 5% Mg, 1% Si, and small amounts of Mn, Fe, and Ti. Its thermal conductivity increases more rapidly with temperature than that of other alloys, which is desirable for above application. Tables and graphs. 16 ref.

10205* A New High-Yield-Strength Alloy Steel for Welded Structures. L. C. Bibber, J. M. Hodge, R. C. Altman, and W. D. Doty. *Transactions of the American Society of Mechanical Engineers*, v. 74, Apr. 1952, p. 269-284; disc., p. 284-285.

Development, metallurgical characteristics, welding and gas-cutting characteristics, low-temperature toughness, applications, and engineering potentialities of USS "Carilloy" steel designated "T-1" is characterized by yield strength levels of 100,000 psi., and above. At these high strengths, it retains its toughness to much lower temperatures than ordinary structural steels. In addition, welds which develop the full strength of the base metal can be made without preheating or postheating.

10206* Fatigue Tests of Piping Components. A. R. C. Markl. *Transactions of the American Society of Mechanical Engineers*, v. 74, Apr. 1952, p. 287-299; disc., p. 299-303.

Compilation of available fatigue-test data on steel piping components. Stress-intensification factors relative to straight pipe are derived. Suggests empirical correlations by which application of the available data can be expanded to a wider range of sizes and conditions. 14 ref.

10207* Strain-Hardening and Softening With Time in Reference to Creep and Relaxation in Metals. A. Nadai. *Transactions of the American Society of Mechanical Engineers*, v. 74, Apr. 1952, p. 403-413.

Analytical expressions are formulated for describing influence of strain-hardening, of time rate of change of flow resistance, and of recovery strains on creep and relaxation of metals under uniaxial stress.

10208* Peculiar Behavior of Steel Beams Under Dead Loads That Produce Inelastic Strains. H. T. Corten, M. E. Clark, and O. M. Sidebottom. *Transactions of the American Society of Mechanical Engineers*, v. 74, Apr. 1952, p. 349-354.

Investigation was undertaken to determine effect of testing members under dead load where each increment of load could be maintained on the member a sufficient length of time until equilibrium was attained. 5 statically determinate beams, 4 mild-steel beams of various cross sections, and one rail-steel rectangular beam were tested in a dead-load testing machine. Load-deformation diagrams were found to have a stairstep appearance, unlike the smooth continuous curves usually reported. Ultimate load-carrying capacity of the mild-steel beams was found to be considerably below that predicted by theory.

10209* An Experimental Investigation of Over-Straining in Mild-Steel Thick-Walled Cylinders by Internal Fluid Pressure. M. C. Steele and John Young. *Transactions of the American Society of Mechanical Engineers*, v. 74, Apr. 1952, p. 355-361; disc., p. 361-363.

Mechanism of yielding was studied and strains observed at the bore and outside surfaces of mild-steel cylinders of 2:1 diameter ratio under internal fluid pressure was compared with plastic theories. Observations disagree with theoretical assumptions concerning the progression of yielding.

10210* Dynamic Properties of Nodular Cast Iron. Part I. Harry Majors, Jr. *Transactions of the American Society of Mechanical Engineers*, v. 74, Apr. 1952, p. 365-375; disc., p. 376-380.

Results of investigation on mechanical properties of Mg-treated nodular cast iron in the annealed and as-cast condition. Dynamic stress-concentration factors are compared with Neuber's theoretical factors for hyperbolic notches, with Peterson's results on steel, with Frocht's photoelastic results, and with Grant's data on flake cast iron and Ce-treated nodular iron. Fatigue results are shown for square and 45° V notches at 200 and 6000 rpm., as well as for various notch depths. Static damping capacities are compared with torsional damping capacities. 30 ref.

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10211* Relaxation of Stress in a Heat-Exchanger Tube of Ideal Material. E. A. Davis. *Transactions of the American Society of Mechanical Engineers*, v. 74, Apr. 1952, p. 381-385.

Analytical solutions of the relaxation of an elasticoviscous tube in a rigid tube sheet in both plane stress and modified plane strain are worked out. Effect of reloading tensile specimens in relaxation is discussed and results of tests on an Al alloy are presented to illustrate these effects.

10212 Recrystallization Textures in Copper Wire. G. Bassi. *Journal of Metals*, v. 4, July 1952; *Transactions of American Institute of Mining and Metallurgical Engineers*, v. 194, 1952, p. 753-754.

Three electrolytic tough-pitch Cu wires of different initial textures were drawn and annealed varying amounts and at varying temperatures. Deformation and recrystallization textures were examined by x-ray diffraction. Illustrated.

10213* Crushing Strength of Steel Pipe Lined and Coated With Cement Mortar. Leslie Paul and Owen F. Eide. *Journal, American Water Works Association*, v. 44, June 1952, p. 525-530.

Experiments on 49-in.-diam. pipe indicate dependability of the von Mises formula as applied to collapse from external pressure of large-diameter steel pipe with closed ends. Customary thicknesses of portland cement mortar of ¾ in. for coatings and ½ in. for lining strengthen 36-in. diam. steel pipe against collapse from external pressure by at least 600%.

10214* Creep Limit and Its Relationship to Other Mechanical Properties From the Point of View of Physics. (German.) Albert Kochendörfer. *Archiv für das Eisenhüttenwesen*, v. 23, May-June 1952, p. 183-191; disc., p. 191-192.

Discusses the plastic behavior of monocrystals, such as slip, rate of solidification, and the significance of displacements. Proposes application of the same laws to polycrystals. Possibility of influencing the creep curve, and thus the creep resistance, is indicated. Illustrated by data for a variety of ferrous and nonferrous metals. Graphs and tables. 57 ref.

10215* The Alternating-Bending Strength of Nitrided Specimens of Varying Diameter. (German.) Karl Wellinger and Paul Gimmel. *Archiv für das Eisenhüttenwesen*, v. 23, May-June 1952, p. 203-205.

Investigation was done on specimens with diameters of 5, 6.5, and 8 mm., of nitrided steel, containing 34% Cr and 6% Al. The results are indicated and interpreted. Tables, charts, and macrographs.

10216* Reciprocal Relationship Between Stress and Deformation Gradients. Part 3. Notch Strength. (German.) Franz Bollenrath and Alex Troost. *Archiv für das Eisenhüttenwesen*, v. 23, May-June 1952, p. 193-201.

Discusses stresses at the notch root. Proposes a calculation method for notch-effect values. Relationship between notch sensitivity and resistance to plastic deformation is indicated. Largely theoretical and mathematical, with graphical interpretation. 17 ref.

10217* Influence of the Volume Fractions of the Phases on the Deformation of ($\alpha+\beta$) Brass. L. M. Clarebrough and G. R. Perger. *Australian Journal of Scientific Research*, ser. A, v. 5, Mar. 1952, p. 114-118.

Relative deformations of the phases were studied, after 20, 40, 60, and 80%. Reductions in area by wire drawing in duplex brasses of various compositions, using as a measure of degree of deformation the temperature at which recrystallization began. Mode of recrystallization of the phases varied with the degree of deformation and volume proportion of the phases.

10218 Gears of Ductile Iron Tested. Bayo Hopper. *Automotive Industries*, v. 107, July 1, 1952, p. 37, 86, 88, 90.

Describes testing procedures for above and gives results of inspection for wear and other effects.

10219* Mechanical and Physical Properties of Aluminium Cast Iron. J. W. Bampfylde. *British Cast Iron Research Association Journal of Research and Development*, v. 4, June 1952, p. 340-359.

Reports an extensive investigation on above, one outcome of which was the development of a scale- and growth-resisting cast iron ("Cralfer.") Special treatment was developed to overcome the tendency of Al irons to oxidize. Details of microstructure are given. Covers Al cast irons without alloy addition; and Al cast irons with low and with high Cr contents. Graphs, photomicrographs, and numerous tables.

10220* Measuring of the Young's Modulus of Metal Bars by an Electromagnetic Method. (French.) Jean Savorin and Georges Renucci. *Comptes Rendus hebdomadaires des Séances de l' Académie des Sciences*, v. 234, May 19, 1952, p. 2045-2046.

Describes experimental arrangement for the above. Shows how the method can also be applied to nonmagnetic rods. Results for a Cd bar are presented and discussed.

10221* Influence of the Thickness of the Babbitt Layer on Its Wear in Bearings. (Russian.) S. E. Gurevich. *Doklady Vsesouiznoi Ordena Lenina Akademii Sel'skokhoziaistvennykh Nauk imeni V. I. Lenina*, v. 17, no. 1, 1952, p. 44-47.

Tests were made on the above. Test equipment is described. Data are tabulated and charted.

10222* Correlation of Fatigue Strength in Bending and Direct Stress. P. G. Forrest and H. J. Tapsell. *Engineering*, v. 173, June 13, 1952, p. 757-758. (A condensation.)

Results in both bending and direct stress on a normalized 0.24%-C steel at 400°C., and a fully softened Al alloy, R.R. 58, at 200°C., both of which are structurally stable at the respective temperatures. In addition, dynamic stress-strain curves were obtained and results were correlated. Tables and graphs.

10223 Castings to Resist Abrasive Wear. E. J. Brown. *Foundry Trade Journal*, v. 92, June 5, 1952, p. 587-595.

Contains a general discussion of wear. Shows how Mn-steel as well as Ni/Cr alloy cast irons and other alloy steels have been developed to meet a number of service conditions, and gives in some detail manufacturing methods and applications for these materials. Flame hardening, nitriding, surface deposits of abrasion-resisting material, heat treatment of Mn steel and alloy cast Fe, and work hardening of steel are considered. Photomicrographs, graphs, diagrams, and photographs.

10224* Volume Sensitivity of Gray Cast Iron. (Swedish.) Gustav Meyersberg. *Gjuteriet*, v. 42, May 1952, p. 71-82.

Discusses variation of strength of specimens. Volume sensitivity of gray cast iron and the so-called rim or skin effect were studied. Diagrams and graphs. 12 ref.

10225 Some Observations on the Deformation of Polycrystalline Zinc. J. A. Ramsey. *Journal of the Institute of Metals*, v. 80, Dec. 1951, p. 167-171.

Shows that polycrystalline Zn, when deformed, behaves in a similar way to Al in that, both at elevated temperature and at slow strain rates, it tends to form a sub-grain or cell structure within the grains. Evidence is presented in support of the view that the cell structure is produced directly by deformation and cannot be adequately explained by the same mechanism as that suggested for polygonization. 14 ref.

10226 Some Metallographic Observations on the Fatigue of Metals. P. J. E. Forsyth. *Journal of the Institute of Metals*, v. 80, Dec. 1951, p. 181-186.

Metallographic investigation of effects of cyclic stresses on microstructure of an Al ½% Ag alloy showed that factors other than simple slip are involved in the mechanism of fatigue at room temperature. There is evidence of a recovery process associated with formation of deformation bands and crystallites during fatiguing of the metal, and it is suggested that observed anomalies in effect of stress concentration on crack progress are the result of crystallite formation at the roots of the cracks. 12 ref.

10227 Boundary Slip in Bicrystals of Tin. K. E. Puttick and Ronald King. *Journal of the Institute of Metals*, v. 80, June 1952, p. 537-544.

Specimens of Sn consisting of 2 crystals meeting in a straight boundary were stressed in shear to cause relative movement of the crystals at the boundary. Relation between relative movement and time under steady stress was examined at a number of stresses and temperatures, for a standard type of specimen in which the *c* axes of the crystals were at right angles to one

another and at 45° to the boundary. Appendixes give information on growth of crystals and conditions for straight boundaries, and on grain-boundary surfaces. Diagrams, graphs, macro- and micrographs. 15 ref.

10228 X-Ray Diffraction Studies in Relation to Creep. G. B. Greenough, Catherine M. Bateman, and Edna M. Smith. *Journal of the Institute of Metals*, v. 80, June 1952, p. 545-550.

To investigate a hypothesis regarding the mechanism of creep put forward by Greenough and Smith, 2 Al-Ag alloys, one a solid solution and the other containing a precipitate, were examined. Experiments were also carried out on recovery of specimens quickly pulled at either 20 or 300°C. Tables and x-ray photographs. 18 ref.

10229* Plastic Flexure on Mild Steel Beams of Rectangular Cross-Section. K. K. Shackell and J. H. Welsh. *Institution of Mechanical Engineers, Proceedings*, sec. A, v. 166, no. 1, 1952, p. 112-119; disc., p. 119-122.

Describes tests on a 0.28% C steel in tension and compression and in the above, to determine the shape of the stress-strain curve immediately after the initial yielding, and to determine whether the upper yield stress can be relied upon as a criterion of design. Graphs and diagrams.

10230 How Good is 80B30? Temper Brittleness, Fatigue and Low Temperature Impacts Studied. R. N. Imhoff and James W. Poynter. *Iron Age*, v. 169, June 26, 1952, p. 102-107.

Describes Air Force tests on above boron steel. Much data summarized in tables and graphs.

10231 Strain Hardening and Aging. H. A. Unckel. *Iron & Steel*, v. 25, June 1952, p. 273-278.

A study on the quench-aging and strain-aging behavior of low-carbon steels with different carbon contents and different treatment. Includes graphical and tabular data on hardness and tensile properties. Photomicrographs. 12 ref.

10232* On the Direction of Fatigue Cracks in Polycrystalline Ingot Iron. F. A. McClintock. *Journal of Applied Mechanics*, v. 19, (*Transactions of the American Society of Mechanical Engineers*, v. 74), Mar. 1952, p. 54-56.

A statistical analysis is developed to show how a microscopic shear failure can result in the apparent tensile failure of polycrystalline Fe in rotary bending fatigue tests. For comparison with theory, 12 Moore-type specimens of ingot Fe were run at 27,000 psi. and examined. 10 ref.

10233* Statistical Design of Fatigue Experiments. Waloddi Weibull. *Journal of Applied Mechanics*, v. 19, (*Transactions of the American Society of Mechanical Engineers*, v. 74), Mar. 1952, p. 109-113.

An analytical expression connecting fatigue lives with applied stresses, and methods for computing the values of its parameters from experimental data are given. Formulas for estimating the uncertainty of computed parameter values are deduced. Testing time and costs may be reduced by more than 40% using the formulas. Gives example for pulsating tensile fatigue tests on Al alloy 75S. Graphs and tables.

10234 Conical Surfaces of Fracture Produced by Asymmetrical Impulsive Loading. John S. Rinehart and John Pearson. *Journal of Applied Physics*, v. 23, June 1952, p. 685-587.

A study of the origin of the above in thick-walled cylinders loaded through use of internal explosive charges. The angle of fracture associated with these conical surfaces was used to measure velocity of propagation of stress waves in low-carbon steel, brass, Cu, Pb, and Al. Tables, diagrams, and photographs.

10235 The Change of the Elastic Constants of β-Brass With Composition. H. Jones. *Journal of Applied Physics*, v. 23, June 1952, p. 697.

Chiefly discusses effects of ion-ion interactions on shear constants and bulk modulus, and Fermi-energy phenomena.

10236 Observations on the Tension Texture of Aluminum. E. A. Calnan and Betty E. Williams. *Journal of Metals*, v. 4, July 1952; *Transactions of American Institute of Mining and Metallurgical Engineers*, v. 194, 1952, p. 743-744.

Three Al specimens were examined in detail, one of cold-rolled high purity rod (99.99%), and two of commercial extruded rod (99.4%.) Results of tests on annealed materials are discussed.

10237 Preferred Orientations in Vanadium. Carl J. McHargue and Joseph P. Hammond. *Journal of Metals*, v. 4, July 1952. *Transactions of American Institute of Mining and Metallurgical Engineers*, v. 194, 1952, p. 745-746.

Presents the cold-rolled and the recrystallized wire textures, and the cold-rolled and the recrystallized sheet textures for V. Results show that the textures in V are not significantly different from those reported for other body-centered-cubic metals. Diagrams. 13 ref.

10238* Steam Pipe Materials for Advanced Steam Conditions. D. W. Crancher. *Machinery Lloyd* (Overseas Ed.), v. 24, June 7, 1952, p. 69, 71, 73, 75-85.

A survey to aid in selection of above. Four steels are described which cover a range of temperatures up to 1050°F. These are plain-carbon steel and 3 low-alloy steels containing Mo, Cr, and V. Discusses resistance to creep and corrosion, stability of the microstructure, and suitability for manufacturing and welding. An appendix gives notes on creep of metals and creep testing.

10239 European Research on the Behavior of Metals Yields Promising Results. Thomas J. Dolan. *Materials & Methods*, v. 35, June 1952, p. 93-96.

Describes unusual testing methods used to determine design criteria and especially to study the nature of fatigue and creep. Work on experimental stress analysis is included. Observations were made in England, Scotland, Switzerland, and Sweden. Photographs of equipment.

10240 High Tensile Beta Brass. A. R. Bailey. *Metal Industry*, v. 80, June 27, 1952, p. 519-522, 526.

Describes an investigation of intercrystalline weakness in the above. 12 different alloys containing 50.71-63.35% Cu, 28.13-48.93% Zn, 0-20.5% Al, 0-1.94% Mn, 0-2.10% Fe, 0-0.45% Sn, and 0-1.02% Ni were examined for microstructure and tensile properties. Tables and micrographs. 12 ref.

10241* The New Light-Metal Bearing Alloy, K-4. (German.) A. Rühenbeck. *Metall*, v. 6, June 1952, p. 291-298.

Reports experiences with the above. Describes in particular fundamentals of the metallurgy of bearing metals, properties of the "K-4" Al-Zn-Mg bearing alloy, its testing, further developments, and economic considerations. Micrographs and macrographs illustrate structures of different bearing alloys. Comparative properties are tabulated, charted, and discussed.

10242* Metals and Insulating Materials—A Comparison. (German.) W. Späth. *Metall*, v. 6, June 1952, p. 305-307.

Compares some mechanical and physical test results for rubbers and plastics with corresponding data for metals. Points out similarities and differences.

10243 The Creep and Fatigue Properties of Two Commercial Aluminium Bronzes at 500°C. J. J. Carter, D. N. Mends, and J. McKeown. *Metallurgia*, v. 45, June 1952, p. 273-281.

Concerns alloys used in tubular heat exchangers for gas turbines. Covers: scaling behavior; creep, stress-rupture time, and fatigue tests in both cold-worked and annealed conditions; structure after these tests; effect of grain size on creep resistance of the annealed materials; and changes when held at 500-600°C. for long periods without applied stress. Structure and mechanical property data on the as-received materials are given. Graphs, tables, and photomicrographs.

10244 The Influence of Shot Peening on the Fatigue Properties of Steel. W. J. Harris. *Metallurgia*, v. 45, June 1952, p. 299-300.

Experimental results for above on various steels. Examples are given where beneficial effects are obtained. Tables.

10245 Equipment for Creep Testing at Temperatures up to 200°C. R. J. M. Payne. *Metallurgia*, v. 45, June 1952, p. 322-324.

The time taken in adjusting the temperature and temperature uniformity of creep-test specimens, particularly at temperatures below 200°C. is greatly reduced by oil-bath heating of the test pieces. The particular equipment described enables 6 tests

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to be carried out simultaneously at the same temperature. Photograph and apparatus diagrams.

10246* Relationship Between Tensile and Creep Strains and Recrystallization. (French.) B. Jaoul and C. Crussard. *Metallurgia Italiana*, v. 44, May 1952, p. 175-179.

During a study of the shape of tensile-strength curves of several Al alloys, a sharp break in the plastic deformation curves was found to exist. Presents formulas representing the two portions of the curve. The transition point between the two types of deformation corresponds to the beginning of fracture of the grains. Creep tests on the same alloys show that stress corresponding to the beginning of fracture has approximately the same value as creep limit. Concludes that creep cannot occur until grain fracture begins. From exact analysis of the stress curves, approximate values of creep limit and critical recrystallization point may be determined. Graphs. 13 ref.

10247 High-Temperature Aluminum Alloy. *Metal Progress*, v. 67, June 1952, p. 162, 164, 166. (Condensed from "A Mischmetal Aluminum Alloy for Elevated Temperature Service", B. M. Loring, W. H. Baer, and C. G. Ackerlind, Naval Research Laboratory, Report 3871, Nov. 1, 1951.)

An alloy of Al and mischmetal (50% Ce and the rest the other rare earths including La), was found to have considerable promise as a high-temperature alloy in comparison with conventional age-hardening Al alloys. Mechanical-test data are tabulated and charted. Describes melting procedure to avoid segregation.

10248 A Survey of High-Temperature Materials. J. M. Robertson. *Metal Treatment and Drop Forging*, v. 19, June 1952, p. 275-283.

Surveys certain aspects of the above field. Mechanical properties of metals at high temperatures are described and types of alloys available for use between 450 and 950°C. are discussed. Precipitation hardening is described. Numerous graphs. (To be continued.)

10249* Fundamental Experiments in the Fracture of Solids. (French.) A. Guinier. *Métaux: Corrosion—Industries*, v. 27, Apr. 1952, p. 150-155.

Reviews complex phenomena of the above on the basis of the literature. Discusses in particular calculation of cohesion in ionic crystals; measurement of surface tension of solids; the role of defects; and the work of Griffith, Joffé, Smekal, and Orowan. 15 ref.

10250* Contribution of the Method of Rheoelectric Analogies to Calculation of Stresses. (French.) L. Malavard. *Métaux: Corrosion—Industries*, v. 27, Apr. 1952, p. 169-184.

Reviews the principal possibilities and applications of above method on the basis of the literature. Discusses particularly its basic principles, determination of total stresses, torsion in simple and rectangular bars, and determination of stresses in an elastic plane. Diagrams and illustrations.

10251 Effect of Temperature on the Tensile Properties of High-Purity Nickel. William D. Jenkins and Thomas G. Digges. *Journal of Research of the National Bureau of Standards*, v. 48, Apr. 1952, p. 313-324.

Tension tests were made at temperatures from −320 to 1500° F. on annealed high-purity Ni. Exceptions to the usual trend of decreasing strength and increasing ductility with increasing test temperatures were observed and discussed.

10252 Influence of Structure on the Plastic Flow of Steel Above the A_3-Point. P. Feltham. *Nature*, v. 169, June 7, 1952, Study of the relationship between temperature and flow-rate of steel at a given stress. Results of experiment shown graphically. p. 976.

10253* The Formation of Immobile Dislocations During Slip. A. H. Cottrell. *Philosophical Magazine*, ser. 7, v. 43, June 1952, p. 645-647.

Mathematical approach to the above. Considers Lomer's reaction, a second reaction, an alternate reaction sequence, and work hardening.

10254* An Electron-Microscope Study of the Effect of Temperature and Strain-Rate on the Mechanism of Deformation of Aluminium. R. I. Garrod, J. W. Suiter, and W. A. Wood. *Philosophical Magazine*, ser. 7, v. 43, June 1952, p. 677-685.

Electron-microscope observations show that there are 3 basic stages in the mechanism of deformation of metals. Discusses these experimental observations, their interpretation in terms of structural changes, and their possible relationship to the dislocation theory of deformation. Diagrams. 10 ref.

10255* Critical Shear Stresses in Body-Centered Cubic Lattices. R. Smoluchowski. *Physical Review*, ser. 2, v. 86, June 1, 1952, p. 787-789.

Shows how a consideration of shape and atomic configuration of dislocations in above lattices allows an estimate of the ratio of critical shear stresses on various slip planes as a function of temperature. Table showing relative values of critical shear stresses of Cu, Zn, and Fe.

10256 The Influence of Electrolytes on the Mechanical Properties of Certain Metal Single Crystals. E. N. da C. Andrade and R. F. Y. Randall. *Proceedings of the Physical Society*, v. 65, sec. B, June 1, 1952, p. 445-455.

Shows that the contact of electrolytes has a marked effect on the mechanical behavior of single crystals of Cd and Zn which have been exposed to the air. 10 ref.

10257 A Critical Look at Fatigue Equations. E. H. Schuette. *Product Engineering*, v. 23, July 1952, p. 150-151.

Empirical fatigue equations are unreliable and often misleading. This is demonstrated by application of 4 such equations to test data for a Mg alloy. Values of the endurance limit range from 0 to 19,000 psi. for the same material, depending on which of the 4 equations is used.

10258* Considerations on the Modulus of Elasticity and Elastic Limit of Alumina—Aluminum Complexes. (French.) R. de Fleury. *Revue de l'Aluminium*, v. 29, May 1952, p. 183-185.

Discusses recent study by Roland Irmann on sintered, heat-resistant Al. Explains, on the basis of theoretical considerations, the peculiar characteristics of above sintered mixture.

10259 Influence of Thermal Treatment on Tensile-Stress Curves of Mild Steel. (French.) P. Bastien and C. Winter. *Revue de Métallurgie*, v. 49, May 1952, p. 328-337; disc., p. 338.

Mild steels of various composition were studied for the above. Discusses in particular influence of thermal treatment on plasticity moduli, and the experimental set-up. Results are interpreted. Data are tabulated and charted. Test specimens are illustrated.

10260* Fatigue of Aircraft Materials With Special Reference to Micro-Structure. P. L. Teed. *Journal of the Royal Aeronautical Society*, v. 56, June 1952, p. 427-437.

Consists of a general discussion of microstructure illustrated by photomicrographs, followed by a consideration of effect of microstructure on fatigue. A variety of metals and alloys are mentioned. Graphs and tables.

10261 The Flow of Polycrystalline Metals Under Simple Shear. E. N. da C. Andrade and K. H. Jolliffe. *Proceedings of the Royal Society*, ser. A, v. 213, June 5, 1952, p. 3-26.

Creep of 3 polycrystalline metals—commercial Pb, pure Pb, and Cd—were investigated under conditions of simple shear, by a method in which a constant couple is applied to an annulus cut in a thicker disk of the metal. For comparison, normal tensile tests were carried out on wires of the same metals. Cause of the elimination of permanent creep under the conditions of simple shear is discussed and a variety of experimental results explained in terms of intracrystalline and boundary effects. Numerous graphs and tables. 11 ref.

10262* General Considerations on the Testing of Steels for Their Tendency to Brittle Fracture. (German.) Ed. Amstutz. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 18, May 1952, p. 149-152.

Discusses the fact that no known tests are capable of supplying absolute values concerning the above tendency of steels. Warns against using favorable test results for the purpose of disguising production defects.

10263* Temper Brittleness, Its Occurrence, Causes, and Methods for Avoidance. (German.) A. Legat. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 18, May 1952, p. 160-168.

Discusses tests made by various investigators on Cr, Mn, and Si steels, for the above. Graphs.

10264* Permanent Hot Hardness of High-Speed Steels. (German.) E. Bickel. Schweizer *Archiv für angewandte Wissenschaft und Technik*, v. 18, May 1952, p. 168-173.

Investigates the permanent hot hardness of tungsten high speed steels with various additions of Co, also during normal heat treatment. Results at various temperatures are indicated. Graphs.

10265* Deformability of Slag Inclusions in Steel and Its Significance in Evaluation of Forgings. (German.) Erich Scheil and Rudolf Schnell. *Stahl und Eisen*, v. 72, June 5, 1952, p. 683-687.

Difference between behavior of oxide and sulfide inclusions upon deformation. Dependence of deformability of oxide inclusions on temperature. Determination of degree of deformation of sulfide inclusions, and of forging temperature from deformation of the silicates. Graphs, tables, and photomicrographs.

10266* Wear Resistance of Metal-Cutting Machine Guides. (Russian.) V. A. Ambarov. *Stanki i Instrument*, v. 23, Jan. 1952, p. 21-24.

Results of experimental investigation of the above for a number of different steels and cast irons. Tables and graphs.

10267 What Can Be Learned From the Hardness Test. Part II. Howard E. Boyer. *Steel Processing*, v. 38, June 1952, p. 280-285, 298-299.

Discusses common errors in hardness-testing operations; design of suitable supporting structures; use of different indenters; brands of hardness testers; and micro-hardness testing. Diagrams, photographs, and photomicrographs.

10268 Fatigue Testing at the T.N.O. Metals Institute. (Dutch.) F. H. Toneman. *TNO Nieuws*, v. 7, May 1952, p. 142-146.

Discusses types of fatigue testing and operation of the 100-ton apparatus. Photographs and a chart.

10269 Stress Concentrations in Steel Under Cyclic Load. E. Orowan. *Welding Journal*, v. 31, June 1952, p. 273s-282s.

Discusses the behavior of stress concentrations in ductile bodies under cyclic load with particular reference to steel pressure vessels. Main topics are: influence of local plastic yielding on final stress range at a stress peak; progressive change of stress and strain cycles in the plastic surface layers of a rod in alternating bending; progressive change of local stress and strain amplitudes in general cyclic bending, and in repeated bending; the Bauschinger effect; other cases of stress inhomogeneity; connection with the physical theory of fatigue; observed fatigue behavior of bent and notched specimens; fatigue at high stress amplitudes; local strain hardening during the pressure test; and effect of strain aging. Schematic diagrams.

10270 A Resume of the Ship Fracture Problem. Finn Jonassen. *Welding Journal*, v. 31, June 1952, v. 316s-318s.

Work of the Ship Structure Committee has led to major improvements in existing ships and points the way for better steels, fabricating procedures, and design in new construction.

10271* The Behavior of Materials and Their Welds at Low Temperatures. (German.) Werner Hoffmann. *Zeitschrift des Vereines Deutscher Ingenieure*, v. 94, June 11, 1952, p. 519-522.

Low-temperature mechanical-property tests down to −195°C. with welded and unwelded carbon and alloy steels indicate that the welds do not materially reduce the strength of the steels. Tables, graphs, and photomicrographs.

Miscellaneous Publications

10272 Strain Ageing: A Survey of the Literature. F. G. Lewis. Aeronautical Research Laboratories, Dept. of Supply, Commonwealth of Australia, Report SM-187, Jan. 1952, 56 pages. (TL529 A78rsm)

Critical review of all aspects of the strain aging of steel including effect on mechanical and physical properties; influence of composition; relationship between strain aging and quench aging; yield point and blue brittleness, and current theories. Graphs and photomicrographs. 72 ref.

10273 Effect of Speed of Testing on the Tensile Properties of Copper and Copper-Base Alloys. N. H. Murdza. American Society for Testing Materials, Preprint 11a, 1952, 16 pages. (TA401 Am35p)

Presents results of a series of tests made by various government (both U. S. and Canadian) and industrial testing laboratories to show effect of speed on yield strength, tensile strength, and elongation of Cu and free-cutting brass rod.

10274 Load-Deflection Relationships in Slow-Bend Tests of Charpy V-Notch Specimens. R. Raring. American Society for Testing Materials, Preprint 65, 1952, 16 pages. (TA401 Am35p)

Load-deflection diagrams of slow-bend tests, at temperatures through the transition range of Charpy V-notch specimens of quenched-and-tempered and of pearlitic steels containing 0.01-0.63% and having tensile strengths of 48,000-152,000 psi. are shown. Characteristics of the diagrams and of development of the crack are observed. Results are compared, on the basis of energy absorbed and of transition temperature, with those of impact tests of the same steels. Some correlation between slow notch-bend tests and tension tests is shown.

10275 Effects of Machining Specimens on the Results of Tension Tests of Annealed Aluminum Alloys. G. W. Stickley and K. O. Bogardus. American Society for Testing Materials, Preprint 66, 1952, 6 pages. (TA401 Am35p)

Tension tests of the annealed temper of 15 compositions of Al alloys described show that yield strength of high-purity Al may be doubled merely by machining of the test specimen and that some alloys having higher yield strengths are affected similarly but to a lesser extent. There is also some effect on elongation. No effect on tensile strength was found.

10276 An Inquiry Into the Reproducibility of Impact Test Results. H. L. Fry. American Society for Testing Materials, Preprint 67, 1952, 4 pages. (TA401 Am35p)

Study consisted mainly of performing a large number of comparative tests on C-1020 and 4340 steels on 5 impact machines, with all variables controlled as closely as possible. Most of the work was done on keyhole-notch Charpy specimens, but Izod and V-notch Charpy specimens were also studied. Tables and graphs.

10277 Creep-Tension Relations at Low Temperatures of Metals. J. D. Lubahn. American Society for Testing Materials, Preprint 71, 1952, 28 pages. (TA401 Am35p)

The best previous notion of how to determine creep behavior from the results of tension tests was to cross-plot tension curves determined at various constant rates. This procedure will not yield the creep curves for metals like Cu or 61S-T Al tested at room temperature because the stress-strain curves at different rates differ by less than the variations in deformation resistance among the specimens. A new procedure is suggested, based upon a logarithmic relationship resulting from the hypothesis that mechanical behavior is independent of past history. Preliminary results are encouraging but inconclusive. 25 ref.

10278 The Influence of Periodic Overstressing on the Creep Properties of Several Heat Resisting Alloys. G. J. Guarnieri and L. A. Yerkovich. American Society for Testing Materials, Preprint 72, 1952, 13 pages. (TA401 Am35p)

Provides exploratory data for evaluating the significance of variables controlling the cyclic-load creep properties of heat-resistant alloys. Test equipment and procedures were developed for conducting overload tests under conditions similar to those encountered in turbojet aircraft during maneuvering. Tests were conducted on Type-347 stainless steel at 1200 and 1500°F. for various normal stress levels with overstress to normal stress ratios of 1.2, 1.5, and 3.0. Similar tests were performed on N-155 alloy at 1500 and 1800°F. and for H.S. 21 alloy at 1500°F. Results are correlated into design charts which relate stress, time, temperature, ratio of overstress to normal stress, and time percentage of overstress application. A method for calculating overstress characteristics from static-load creep-test data was explored.

13. *Metals—Mechanical Properties and Tests*

10279 Rheotropic Embrittlement. E. J. Ripling. American Society for Testing Materials, Preprint 73, 1952, 6 pages. (TA401 Am35p)

The ductility deficiency exhibited by metals not crystallizing in the face-centered cubic system, when these metals are strained at low temperatures, high strain rates, or in the presence of hydrostatic tension, has recently been shown to be partially strain curable. The portion of this embrittlement which can be overcome by prestrain under some ductile conditions has been labeled "rheotropic embrittlement." Reviews recent literature on influence of variables which affect rheotropic behavior. Graphs.

10280 A Survey of Embrittlement and Notch Sensitivity of Heat Resisting Steels. George Sachs and W. F. Brown, Jr. American Society for Testing Materials, Preprint 74, 1952, 15 pages. (TA401 Am35p)

Results of each series of experiments are presented separately and an attempt is made to determine the general effects of the important variables, to show the relationship between the phenomena observed, and to suggest a mechanism for the embrittlement.

10281 Effect of a Notch and of Hardness on the Rupture Strength of "Discaloy". F. C. Hull, E. K. Hann, and H. Scott. American Society for Testing Materials, Preprint 75, 1952, 10 pages. (TA401 Am35p)

In an Fe-Ni-Cr-Mo-Ti austenitic alloy, effects of hardness as varied by the hardener, Ti, were related to the behavior of the material in the presence of a notch. Creep-rupture and notched-bar rupture tests were conducted at 1000 and 1200°F. Tables and graphs.

10282 Influence of Sharp Notches on the Stress-Rupture Characteristics of Several Heat-Resisting Alloys. W. F. Brown, Jr., M. H. Jones, and D. P. Newman. American Society for Testing Materials, Preprint 76, 1952, 21 pages. (TA401 Am35p)

Stress-rupture tests were carried out on a number of low-alloy steels, ferritic stainless steels, and austenitic alloys. Both unnotched and sharply notched bars were tested at various temperatures. Ductilities were determined for both unnotched and notched specimens. It was found that all alloys tested were subject to notch weakening. Tests at 900, 1000, 1100, and 1200°F. on a low-alloy Cr-Mo-V steel indicated the notch sensitivity to be time-temperature dependent.

10283 Effect of Notch Geometry on Rupture Strength at Elevated Temperatures. E. A. Davis and M. J. Manjoine. American Society for Testing Materials, Preprint 78, 1952, 21 pages. (TA401 Am35p)

Three series of creep-rupture tests of notched bars with varying geometry of the notch were performed at elevated temperatures on several heat-resistant alloys. Effect on notch sensitivity of stress level, grain size, hardness, ductility, and heat treatment were also investigated.

10284 Theory of Time-Dependent Rupture and Interpretation of Some Stress-Rupture Data. D. N. Frey. American Society for Testing Materials, Preprint 80, 1952, 7 pages. (TA401 Am35p)

Proposes that the time-dependent rupture of a majority of steel and other austenitic alloys over the temperature range of interest in gas turbines (1000-1800°F.) be considered to have a mechanism involving both Griffith's and Zener's theories. Presents and interprets some data on effect of aging at 1400 prior to testing at 1200°F. on the strength of solution-treated 16-25-6 alloy. Also discusses effect of circumferential notches on elevated-temperature rupture strength. Graphs. 11 ref.

10285 Effect of Sigma on Strength and Ductility of 25 Cr, 20 Ni steel. G. V. Smith and E. J. Dulis. American Society for Testing Materials, Preprint 82, 1952, 11 pages. (TA401 Am35p)

Sigma phase in 25-Cr, 20-Ni austenitic stainless steel was found to cause moderate strengthening at room temperature, severe loss in toughness even at temperature as high as 500°F., and moderate loss of creep-rupture strength at 1300°F.

10286 Recovery and Creep in an Alloy Steel. H. A. Lequear and J. D. Lubahn. American Society for Testing Materials, Preprint 83, 1952, 17 pages. (TA401 Am35p)

By interrupting a creep test and observing that the creep rate is higher afterward than before by amounts increasing with duration of the interruption, it was possible to establish that recovery had occurred. Recovery occurs in quenched-and-tempered, low-alloy, Cr-Mo-V steel at 1000, but not at 800°F.

10287 Exploratory Investigation of High-Temperature Sheet Materials. D. Preston. American Society for Testing Materials, Preprint 85, 1952, 24 pages. (TA401 Am35p)

High-temperature mechanical properties of several materials commercially available in sheet form were determined. They included three Fe-base strain-hardening-type alloys, 3 Fe-base age-hardening-type alloys, and 3 Co-base alloys in the annealed condition. Microstructures are discussed and creep, stress rupture, and short-time tension and yield data are presented for these alloys from room temperature to 1800°F.

10288 The Statistical Nature of the Fatigue Properties of SAE-4340 Steel Forgings. J. T. Ransom and R. F. Mehl. American Society for Testing Materials, Preprint 87, 1952, 19 pages, (TA401 Am35p)

Above was investigated as a part of a systematic study of the mechanical properties of forging steels. Both high- and low-quality forgings of the same tensile-strength level were studied. Specimens were taken in the longitudinal and transverse directions. Procedures were used to permit statistical analysis of variability of endurance limit and life to failure. Variability was found to be greater than generally estimated from results of conventional non-statistical testing programs.

10289 A Statistical Interpretation of the Effect of Understressing on Fatigue Strength. E. Epremian and R. F. Mehl. American Society for Testing Materials, Preprint 90, 1952, 7 pages. (TA401 Am35p)

Purpose of the investigation was to study the under-stressing effect from a statistical viewpoint. The experimental work was an extension of the research reported in a companion paper. The materials studied were annealed Armco iron, and SAE-4340 in two heat treatments: quenched and tempered, and quenched and spheroidized.

10290 Effect of Prior Repeated Stressing on the Fatigue Life of 75S-T Aluminum. Thomas J. Dolan and Herbert F. Brown. American Society for Testing Materials, Preprint 91, 1952, 8 pages. (TA401 Am35p)

Damage produced in 75S-T Al alloy by repeated loading at one stress amplitude was measured by relative reduction of fatigue life when the specimen was retested at a second stress level. Specimens were prestressed at one of three selected stress levels and then tested to failure at a fourth or "test stress" level.

10291 An Investigation of the Coaxing Effect in Fatigue of Metals. G. M. Sinclair. American Society for Testing Materials, Preprint 92, 1952, 9 pages. (TA401 Am35p)

Fatigue resistance of some metals may be improved by understressing resistance by gradually increasing the amplitude of the alternating stress in small increments, a procedure ordinarily called "coaxing". A study was made of the effect of various coaxing procedures on fatigue resistance of ingot iron, SAE-1045 and 2340 steels, 75S-T6 Al alloy, and annealed 70-30 brass.

10292 The Anisotropy of the Fatigue Properties of SAE-4340 Steel Forgings. J. T. Ransom and R. F. Mehl. American Society for Testing Materials, Preprint 93, 1952, 9 pages. (TA401 Am35p)

Above was studied statistically using heats which showed both high and low transverse average tensile reduction of area. Concludes that the anisotropy of fatigue properties, like the anisotropy in reduction of area, is determined to a large part by presence of fragmented stringer-type inclusions.

10293 Fatigue of 76S-T61 Aluminum Alloy Under Combined Bending and Torsion. William N. Findley. American Society for Testing Materials, Preprint 97, 1952, 16 pages. (TA401 Am35p)

Data are presented for several combinations of bending and tor-

sion. The special fatigue equipment for these tests is described. Fatigue data in torsion are presented for two different types of fatigue machines and results of static tests are tabulated. Literature on effect of combined stress in fatigue is reviewed and the results of the present series are compared with various theories. A possible correction for anisotropy, and energy theories of fatigue under combined stress, are discussed. 49 ref.

10294 The Influence of Temperature on the Elastic Constants of Some Commercial Steels. F. Garofalo, P. R. Malenock, and G. V. Smith. American Society for Testing Materials, Preprint 159, 1952, 18 pages. (TA401 Am35p)

Elastic moduli in tension and in shear were determined at various temperatures between 75 and 1500°F. for 21 commercial steels, both carbon and alloyed. Very good agreement was found between the data obtained and results, determined both statically and dynamically, reported by other investigators. 20 ref.

10295 An Electron Microscope Study of the Development of Fatigue Failures. W. J. Craig. American Society for Testing Materials, Preprint 167, 1952, 13 pages. (TA401 Am35p)

A pictorial comparison is made of deformation marks on the surface of α-brass, ingot iron, and Al under both static and repeated loading. It is shown that, under static loading, deformation is a general process taking place in all crystals, while under conditions of repeated loading, deformation is an extremely localized phenomenon taking place in a few crystals or portions of crystals.

10296 Report of Joint Committee on Effect of Temperature on the Properties of Metals. *American Society for Testing Materials, Proceedings,* v. 51, 1951, p. 216-235. (TA401 Am35p)

Consists of report on publications and technical papers, research projects, etc., plus two project reports: "Study of Effects of Variables on the Creep Resistance of Steels", H. C. Cross and J. A. VanEcho. Test program intended to determine whether a relationship between Si and Al additions might be used to control the creel resistance of fine-grained carbon steels. Higher than normal Si contents did not produce good creep properties in AISI-1015 Al-treated steels; and "Stability of Steels as Affected by Temperature", J. J. Kantner and E. A. Sticha: Presents graphitization-test data on 40 different heats of several low-alloy steels.

10297 Damping, Elasticity, and Fatigue Properties of Temperature-Resistant Materials. B. J. Lazan and L. J. Demer. *American Society for Testing Materials, Proceedings,* v. 51, 1951, p. 611-646; disc., p. 647-648.

Above properties of several temperature-resistant materials were investigated in rotating cantilever-beam testing equipment. The room and elevated-temperature tests were designed to reveal changes in damping energy and dynamic modulus of elasticity series of new diagrams designed to show effects of both stress levels. Usual S-N fatigue curves are presented in addition to a series of new diagrams designed to show effects of both stress magnitude and stress history on damping and elasticity properties. Two methods for comparing damping energies of a group of materials are offered and merits of each discussed. Diagrams facilitate comparison of elasticity properties of materials tested at a given temperature.

10298 The Influence of Cold Work and Heat Treatment on the Engineering Properties of Beryllium Copper Wire. J. T. Richards, R. K. Levan, and E. M. Smith. *American Society for Testing Materials, Proceedings,* v. 51, 1951, p. 771-791. (TA401 Am35p)

Electrical conductivity and tension tests were performed on Be-Cu wire to determine influence of cold work, solution treating, and precipitation hardening. Grain size, preferred orientation, straightening, overstraining in tension, and stress relieving were found to have a marked effect upon tensile strength, proportional limit, ductility, and tension modulus. The method of plotting stress-strain data is also considered.

10299 Fatigue Tests in Axial Compression. N. M. Newmark, R. J. Mosberg, W. H. Munse, and R. E. Elling. *American Society for Testing Materials, Proceedings,* v. 51, 1951, p. 792-803; disc., p. 804-810. (TA401 Am35p)

Presents preliminary results of an investigation of the behavior of materials subjected to repeated compressive loads. Exploratory studies were conducted on gray cast iron, 24S-T Al alloy, and steel. In general, compressive failures occurred only under high stresses. Results, under nearly uniformly distributed axial compressive loads, are in distinct contradiction to those obtained with notched specimens or with repeated bending tests.

10300 Mechanical Properties in Torsion and Poisson's Ratio For Certain Stainless Steel Alloys. C. W. Muhlenbruch, V. N. Krivobok, and C. R. Mayne. *American Society for Testing Materials, Proceedings,* v. 51, 1951, p. 832-852; disc., p. 853-856. TA401 Am35p)

Modulus of elasticity in shear, shearing yield strength, and Poisson's ratio were studied for a number of AISI-300 stainless steels. Values for secant shearing modulus of elasticity and yield strength at a limiting amount of torsional strain are given. Reasons for behavior are advanced, based on analysis of stress-strain relationships, susceptibility to work hardening, and state of stress in the material when subjected to axial loading. A theoretical relationship between Poisson's ration and secant moduli in tension and shear is presented.

10300a Creep-Rupture of Several Sheet Steels. G. V. Smith, E. J. Dulis, and E. G. Houston. *American Society for Testing Materials, Proceedings,* v. 51, 1951, p. 857-868; disc., p. 868. (TA401 Am35p)

Grips for testing sheet or strip in creep-rupture are described and experimental results reported for annealed 18/Cr, 8/Ni (Mo) at 1100, 1300, and 1500°F.; annealed and half-hard 17/Cr, 7/Ni at 600 and 1100°F.; and cold-rolled 4608 (Ni, Mo) at 600°F.

10301 Notch Toughness of Four Alloy Steels at Low Temperatures. W. B. Seens, W. L. Jensen, and O. O. Miller. *American Society for Testing Materials, Proceedings,* v. 51, 1951, p. 918-928; disc., p. 929-930. (TA401 Am35p)

Steels containing nominally 2.5% Ni; 3.5% Ni; 3.5% Ni and 0.25% Mo; and 9% Ni were investigated. Charpy impact specimens with keyhole notch were taken from ⅝ in. plates and from 2-in. plates of all 4 steels and from 0.24-in. or 0.30-in. tubing of 2317 and 2810 steels.

10302 Effect of Annealing on the Creep Properties of 2S-O Aluminum Alloy. O. D. Sherby and J. E. Dorn. *American Society for Testing Materials, Proceedings,* v. 51, 1951, p. 954-963; disc., p. 977-980. (TA401 Am35p)

Effect of stabilizing anneals at 650, 950, and 1150°F. were investigated. Large grains were produced by the 1150°F. treatment, but the other two annealing temperatures produced no grain growth and were essentially recovery treatments. Creep rate decreased with increasing temperatures of anneal, irrespective of grain size, within the ranges of stress and temperatrue investigated.

10303 Mechanical Properties of Copper at Various Temperatures. W. H. Munse and N. A. Weil. *American Society for Testing Materials, Proceedings,* v. 51, 1951, p. 996-1019; disc., p. 1019-1022. (TA401 Am35p)

Results at temperatures from −321 to 400°F. Values of yield strength, ultimate strength, reduction of area, elongation, and modulus of elasticity. Three types of base material were studied: electrolytic tough-pitch Cu, deoxidized high-phosphorus Cu, and oxygen-free high-conductivity Cu. A supplementary series of tests was conducted on cold-rolled, deoxidized, high-phosphorus Cu between −321 and 1200°F. Results are correlated with those reported in the literature for the same and similar materials.

10304 Precipitation Hardening and Creep Limit of Iron-Columbium Alloys and Columbium Alloyed Steels. F. Wever and W. Peter. Henry Brutcher, Translation 1360, 23 pages. (From *Archiv für das Eisenhüttenwesen,* v. 15, 1942, p. 357-361.)

Discusses cause of precipitation hardening in Fe-Cb alloys and Cb steels. Effect of quenching and tempering temperatures upon hardness, creep limit, and notch toughness. Suitable Cb contents for improved creep limit. Effect of 0.8-1.3% Cb on creep limit of austenitic steels. Experimental data on Fe-Ta alloys.

10305 Effect of Columbium on the Creep Strength of Steel. W. Peter. Henry Brutcher, Translation 1561, 19 pages.

13. *Metals—Mechanical Properties and Tests*

(From *Archiv für das Eisenhüttenwesen*, v. 15, no. 8, 1942, p. 364-368.)

Experimental study of conditions under which the Cb content in Cb steels can be lowered without detriment to the creep strength. Effect of carbon content (Cb/C ratio), quenching and tempering temperatures, and structure. Effect of Si on quenching temperature required for optimum creep strength. Role of iron columbide. Influence of small Cb additions to alloys with 0.01-0.02% C and effect of S content of such alloys.

10306 Contribution to the Study of Creep of Boron Steels. G. Delbart and M. Ravery. Henry Brutcher, Translation 2676, 2 pages. (From *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 231, 1950, p. 1498-1500.)

Brief note on creep behavior of 0.30% carbon steel with 0%, 0.009% and 0.015% B. Particulars on heat treatments administered to specimens prior to creep testing. Summary of results.

10307 Grain Size of High-Alloy Austenite as a Factor in Its High Temperature Strength. A. M. Borzdyka. Henry Brutcher, Translation 2796, 12 pages. (From *Izvestiia Akademii Nauk SSSR*, Section of Chemical Sciences, Mar.-Apr. 1949, p. 121-127.)

Previously abstracted from original.

10308 A Critical Review of the Criteria for Notch-Sensitivity in Fatigue of Metals. C. S. Yen and T. J. Dolan. Engineering Experiment Station, University of Illinois, Bulletin Series 398, Mar. 1952, 55 pages. (*University of Illinois Bulletin*, v. 49, no. 53.) (T1 I6b)

Includes graphs. 54 ref.

10309 Friction and Surface Damage of Several Corrosion-Resistant Materials. Marshall B. Peterson and Robert L. Johnsor.. National Advisory Committee for Aeronautics, Research Memorandum E51L20, Feb. 20, 1952, 20 pages. (TL782 Un3rm)

An investigation, in air, of friction and surface damage of several materials resistant to corrosion by liquid metals was made. Values of kinetic friction coefficient at low sliding velocities and photomicrographs of surface damage were obtained. Appreciable surface damage was evident for all materials tested except tungsten carbide. Friction coefficients for the combinations of steel, stainless steel, and Monel sliding against steel, stainless steel, nickel, Inconel, and Nichrome ranged from 0.55 for the Monel-Inconel combination to 0.97 for the stainless-steel–nickel combination; for steel, stainless steel, Monel, and tungsten carbide against Zr the friction coefficients were approximately 0.47. Lower coefficients of friction (0.20-0.60) and negligible surface failure at light loads were obtained with tungsten carbide when used in combination with various plate materials.

10310 Effect of Open Circular Holes on Tensile Strength and Elongation of Sheet Specimens of a Magnesium Alloy. R. S. Barker. National Advisory Committee for Aeronautics, Technical Note 2716, June 1952, 24 pages. (TL570 Un3t)

Data tabulated, charted, and discussed. 10 ref.

10311 Investigation of Statistical Nature of Fatigue Properties. E. Epremian and R. F. Mehl. National Advisory Committee for Aeronautics, Technical Note 2179, June 1952, 119 pages. (TL570 Un3t)

Statistics of fatigue-fracture curves and endurance limits were determined for a variety of materials and, by analysis of these experimental results, effects of some metallurgical factors on the statistical nature of fatigue properties are shown. It was discovered that inclusions play a dominant role and that other factors such as composition and microstructure are of secondary importance. A number of other aspects of the problem were studied, namely, dependence of statistical variations in fatigue life on stress level in the fracture range, statistics of location of crack initiation, size effect and understressing effect from a statistical viewpoint, and form of the S-N diagram and method of plotting it. Materials tested were Armco iron and SAE 1050 and 4340 steels. 50 ref.

10312 Influence of Structure on Properties of Sintered Chromium Carbide. H. J. Hamjian and W. G. Lidman. National Advisory Committee for Aeronautics, Technical Note 2731, June 1952, 21 pages. (TL570 Un3t)

Results show that room-temperature strength and hardness are influenced by stages of sintering, which are defined by grain size and by number, size, location, and shape of pores. It was found that coarse-grained structures are detrimental to room-temperature strength, but perhaps not at elevated temperatures.

10313 Investigation of Alloys of the Fe-Cr System and Certain Alloys of the Fe-Cr-Mn System by a Magnetic Analysis Method. (Russian.) N. I. Korenev and E. I. Koreneva. "Izvestiia Sekotora Fiziko-Khimicheskogo Analiza", v. 20 (Academy of Sciences of the USSR), p. 54-65. (QD453 Ak13i)

Data from magnetic analysis of the above alloys agrees with the results of hardness tests, microstructures, and x-ray analyses. 14 ref.

10314 The Nature of "Naphthalenic" (Coarse-Grained, Transcrystalline) Fracture in High Speed Steel. (Russian.) V. D. Sadovskii, K. A. Malyshev, and M. V. V'ial. "Izvestiia Sektora Fiziko-Khimicheskogo Analiza", v. 20 (Academy of Sciences of the USSR), p. 345-350. (QD453 Ak13i)

An experimental investigation was made of the above. Data are tabulated and illustrated.

Book

10315 Symposium on Statistical Aspects of Fatigue. 64 pages. 1952. American Society for Testing Materials, Philadelphia. (Special Technical Publication 121.) (TA460 Am35ss)

Consists of introduction by R. E. Peterson plus the following papers and their general and specific discussions: "Planning and Interpretation of Fatigue Tests", Alfred M. Freudenthal; "On the Statistical Nature of Fatigue", Foster B. Stulen; and "Statistical Analysis of Fatigue Data", Robert Plunkett.

See also:

9938a (mechanical testing of steel forgings)
9965 (mechanical properties of 85:5:5:5 gun-metal)
9971 (casting technique vs. mechanical properties—Be bronze)
9972 (molds for centrifugal casting)
9989 (steel ingots)
9992 (extrudability of cable lead)
10004 (plasticity theory applied to machining)
10006 (hot-forming vs. mechanical properties of Al)
10017 (hardness of sintered Fe)
10019 (sintered-alloy combinations)
10021 (prealloyed stainless steel powders)
10022 (infiltrated metal-powder parts)
10027 (welded 17-Cr steels)
10028 (Mo and alloy welds)
10034 (mechanical properties of welds)
10036 (nodular cast-iron welds)
10043 (fatigue and static tests on flush riveted joints)
10052 (thermal treatment vs. mechanical properties of ductile cast iron)
10055 (mechanical properties of type 430 stainless)
10057 (Cr-Mo steel pipe)
10103 (structure of impact fractures—alloy steel)
10109 (properties of Ti-O_2 alloys)
10122 (slip-band formation in Al)
10127 (impact strength of alloy steel—H_2 effects)
10137 (elastic modulus of Cu alloys)
10139 (mechanical properties of 70:30 brass)
10176 (magnetoelastic energy losses in ferromagnetic materials)
10327 (tensile properties of Al alloys)
10354 (cracking at edges of rails)
10520 (impact tests for radio-active specimens)
10547 (mechanical testing of steels)
10552 (hardness testing of metals)
10554 (creep curves from stress-strain data)
10555 (ASTM work on determining elastic constants)
10566 (Al roofing sheets)
10567 (high temperature alloys for gas turbines)
10569 (mechanical properties of stainless steels)
10570 (mechanical properties of type 304 stainless steel)
10575 (lead alloys for cables)
10665 (wear of fuel-injection equipment)
10787 (ductile cast iron—properties)
11367 (tensile properties of crystalline materials)

14. CORROSION

10316* The Role of Nitrogen in the High-Temperature Oxidation of Titanium in Air. (Russian.) V. I. Arkharov and G. P. Luchkin. *Doklady Akademii Nauk SSSR*, new ser., v. 83, Apr. 21, 1952, p. 837-839.

The rate of oxidation of Ti and Ti-Fe alloys in air and O_2 was investigated at temperatures up to 1200°C. Data are charted.

10317* Dissolving Steels in Sulfuric Acid Under the Influence of Ultrasonic Vibration. (Russian.) A. P. Kapustin and M. A. Fomina. *Doklady Akademii Nauk SSSR*, new ser., v. 83, Apr. 21, 1952, p. 847-849.

Steel specimens were dissolved in 1N H_2SO_4 during subjection to ultrasonic vibrations of various intensities. Data are tabulated and charted.

10318* Aluminum and Its Alloys in the Wine Industry. (Italian.) L. Gentilini and G. Missier. *Alluminio*, v. 21, May 1952, p. 130-134.

99.5% Al and 3 Al alloys were tested by immersion of strips in 3 types of wine for 30 days at 20 and 40°C. Corrosion took place and the taste of the wine was badly impaired. Further tests in which Al-alloy flasks were internally coated with a phenolic resin gave satisfactory results.

10319* Corrosion Resistance of Aluminium and "Aldrey" Cables. (French and German.) G. Dassetto. *Aluminium Suisse*, v. 2, May 1952, p. 96-99.

Describes above, particularly the behavior of the "Aldrey" Al alloy in climatically particularly difficult zones. Various examples of its use in practice are outlined. Photographs. 14 ref.

10320* Analysis of Some Corrosion Problems in Petroleum Refineries. J. F. Mason, Jr. *Transactions of the American Society of Mechanical Engineers*, v. 74, Apr. 1952, p. 305-312; disc., p. 312-313.

Presents 15 actual corrosion problems and shows steps taken to analyze them in the light of practical experience and available test data obtained under the same or similar conditions. Indicates that Type 502 stainless steel is a highly acceptable and reasonably economical material as a replacement for mild steel, except in instances where mineral acids or chlorides may be present as well as highly alkaline solutions at elevated temperatures. Under the latter conditions, the trend is toward use of more highly alloyed materials such as Monel and Ni together with Cu-base alloys like 70-30 cupronickel, Admiralty metal, and Muntz metal.

10321 Corrosion of Metals Near Wood. *Chemical Age*, v. 66, June 7, 1952, p. 871-872.

Discusses chemical factors that influence wood-metal compatability, on the basis of work of the British Forest Products Research Laboratory. Mentions especially lead and iron.

10322 Hastelloy Alloy C. Edward D. Weisert. *Chemical Engineering*, v. 59, June 1952, p. 297-298, 300, 302, 304-306, 308-310, 312.

Gives corrosion-resistance of this Ni-Mo-Cr alloy to over 150 corrosives, with data on a variety of properties and processes, forms available, and applications. Numerous charts.

10323* The Corrosion of Gas-Burning Appliances. J. Welsh. *Chemistry & Industry*, June 21, 1952, p. 551-555.

Experimental methods have been developed for measuring the dewpoint and, hence H_2SO_4 vapor concentration in combustion products, and new techniques for evaluating the extent of corrosion of metallic specimens by deposition of H_2SO_4 from the products of combustion of manufactured gas containing sulfur. It is shown that serious problems may occur in domestic water heaters. Methods of attacking these problems are defined. 14 ref.

10324 Mercury and Its Compounds—A Corrosion Hazard. M. H. Brown, W. W. Binger, and R. H. Brown. *Corrosion* (Technical Section), v. 8, May 1952, p. 155-164.

Frequently cases of severe corrosion are encountered with equipment fabrication of nonferrous alloys long considered standard for handling or processing a specific chemical. Modified techniques for examination reveal, in most cases, presence of mercury in either the corrosion products, or on the metal surface in the vicinity of the attack, or in the environment. A series of studies was made on the role of mercury and its compounds in promoting corrosion of metals, concentration levels that cause serious attack, and manner by which such substances can be transported through chemical equipment and plants. Shows that concentrations of Hg compounds as low as 0.5 ppm. constitute a serious corrosion hazard for a variety of metals and alloys. Numerous diagrams, graphs, tables, micrographs and macrographs.

10325 The Pitting of Zinc by Distilled Water and Dilute Solutions. U. R. Evans and D. E. Davies. *Corrosion* (Technical Section), v. 8, May 1952, p. 165-170.

Object of the research was to explain the vertical arrangement of pits produced on Zn by distilled water, to study the corrosion products, and to explain their formation. The vertical alignment is due to corrosion product from an upper pit lodging at points below and screening them from oxygen; lines of pits can also be set up by the screening action of a polythene thread. A Zn disc whirled in distilled water containing oxygen suffers no pitting. In stagnant water containing O_2 under high pressure, Zn remains unchanged; at ordinary pressure, it becomes pitted. Results are explained on the theory of oxidation and corrosion advanced by Hoar and Evans. 36 ref.

10326 The Corrosion of Copper and of Metals in Bi-Metallic Systems. George Richard Hill. *Corrosion* (Technical Section), v. 8, May 1952, p. 188-191.

Results of experiments in the Fuel Technology Dept., University of Utah, into the kinetics of initial corrosion of Cu in aerated salt solutions are given. Quick formation of a film inhibits corrosion. Theoretical considerations in corrosion of an Fe-Cu couple are explained. 12 ref.

10327* Aluminum Alloys for Offshore Pipe Lines. Edward T. Wanderer and Donald O. Sprowls. *Corrosion* (Technical Section), v. 8, July 1952, p. 227-233.

Describes above usage. Gives results of various corrosion tests including effects on tensile properties. Describes inert-gas metal-arc welding procedure used. Typical tensile properties and compositions of some Al alloys are listed. Photographs and tables.

10328* A Hydrogen Evolution Method for Evaluation of Corrosion Inhibitors for Oil Wells. Willard R. Scott and Gibson H. Rohrback. *Corrosion* (Technical Section), v. 8, July 1952, p. 234-240.

Describes above method developed to simulate oil-well corrosion, using hot brine and flow conditions and with provision for inhibitor addition. Evaluation procedure and typical test results are given. SAE-1015 steel was used in the form of coupons. Apparatus diagrams, graphs, tables, and photograph.

10329* Vigilance Underground. Byran Patterson. *Corrosion* (Technical Section), v. 8, July 1952, p. 241-246, disc., p. 246.

Summarizes current practices of providing insulation and protection against electrochemical corrosion of buried pipe lines. 24 ref.

10330* Some Observations of the Potentials of Stainless Steels in Flowing Sea Water. K. M. Huston and R. B. Teel. *Corrosion* (Technical Section), v. 8, July 1952, p. 251-256.

Reports potentials of 9 standard grades and 3 new grades of stainless steel. Effects of heat treatment, free-machining element, and crevice corrosion on emf. potentials are discussed. The relation of these potentials to those of yellow brass, Ti, Inconel, and Monel is indicated. Testing set-up is described and illustrated. Tables and graphs.

10331 Film Formation on Metals in Hydrocarbons. Andrew Gemant. *Journal of the Electrochemical Society*, v. 99, July 1952, p. 279-284.

Using a radioactive-tracer technique, rate of salt-film formation on Cu, Pb, and Zn, in solutions of tridecanoic acid in hydrocarbon oil was measured. Effects of amine addition and oxidized oil are considered. Film formation by electrochemical action was studied on Pb and Ag. Tables and graphs.

10332 The Rate of Corrosion of Silver in Ferric Perchlorate Solutions. Cecil V. King and Frances S. Lang. *Journal of the Electrochemical Society*, v. 99, July 1952, p. 295-300.

A detailed study of the above rate with the effect of concentration of ferric, ferrous, and silver ions, of other salts including

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sulfates, and of stirring speed, temperature, and electrical polarization. Evidence is given for the existence of a sulfato-ferric ion. Tables and graphs. 14 ref.

10333 A Potentiometric Study of the Interaction of Zinc Ions With Sodium Silicates. J. Fred Hazel, Wallace M. McNabb, and Paul E. Machemer. *Journal of the Electrochemical Society*, v. 99, July 1952, p. 301-307.

$ZnSO_4$, $ZnCl_2$, and $Zn(NO_3)_2$ were titrated potentiometrically with standard solutions of NaOH and various Na silicates. Results are discussed from the standpoint of use of silicates as inhibitors of aqueous corrosion of Zn. Graphs and table. 32 ref.

10334* Chemical Causes of Wear. J. J. Broeze. *Engineering*, v. 173, May 30, 1952, p. 693-694.

Discusses 3 typical fields in which chemical causes of wear, of practical significance, have been identified: general lubrication, where there is chemical attack by the atmosphere; in engine and gear lubrication, with chemical attack by the lubricants; and in engine lubrication, with chemical attack by the combustion products. Data are charted.

10335* The Tube Camera of the Ruhrgas AG. (German.) Walter Wunsch and Siegfried Brockhaus. *Gas- und Wasserfach*, v. 93, May 15, 1952, p. 229-233.

Describes and illustrates stereoscopic camera which can be inserted into gas pipe lines under pressure in order to study internal corrosion. Typical results are illustrated.

10336 Cathodic Protection Against Corrosion of Heating and Plumbing Equipment. T. W. Reynolds. *Heating and Ventilating*, v. 49, Mar. 1952, p. 83-94.

A comprehensive report. Schematic diagrams.

10337 Corrosion. Mars G. Fontana. *Industrial and Engineering Chemistry*, v. 44, June 1952, p. 81A-82A, 84A.

Materials of construction for handling caustic are discussed with particular reference to stress-corrosion of welded steel. Graphs.

10338 Corrosion. Mars G. Fontana. *Industrial and Engineering Chemistry*, v. 44, July 1952, p. 71A-72A, 74A.

Corrosion resistance of Ta, Cb, Zr, W, and Mo metals is discussed. Tables.

10339 A Mechanism of Stress-Corrosion in Aluminium-Magnesium Alloys. C. Edeleanu. *Journal of the Institute of Metals*, v. 80, Dec. 1951, p. 187-191.

Attack on Al and Al-rich alloys, immersed in neutral chloride solutions, tends to be restricted to a limited area owing to the autocatalytic nature of the anodic reaction. On homogeneous alloys, corrosion causes scattered pits which can increase either in depth or in area; but in the case of alloys possessing a path of easy corrosion, attack takes the form of trenching and is confined to the tips of the cracks so formed. This latter type of corrosion leads to great mechanical weakening. From experiments on Al 7% Mg alloy, it is concluded that stress exerts no influence during the first stages of the process but that corrosion plays a vital role during the final rapid cracking. 13 ref.

10340* The Dissolution of Metals Over the Temperature Range of 25 to −60°. III. The Dissolution of Zinc in Hydrochloric Acid-Methyl Alcohol-Water Solutions. J. Y. Welsh and A. B. Garrett. *Journal of Physical Chemistry*, v. 56, June 1952, p. 727-730.

Data were obtained for the rates of depolarized dissolution of polished and pre-etched Zn in HCl-CH_3OH-H_2O solutions under dynamic conditions.

10241* Gravimetric Investigation Into the Oxidation of Copper-Tin Alloys at Various Temperatures. F. De Carli and N. Collari. *Engineers' Digest*, v. 13, June 1952, p. 183-185, 193. (Translated from *Metallurgia Italiana*, v. 44, Jan. 1952, p. 1-5.)

Previously abstracted from original.

10342* Combating Corrosion From Industrial Chemicals. George Shaffer. *Industry and Power*, v. 63, July 1952, p. 75-90.

Special report includes extensive charts, tables, and graphs. 37 ref.

10343 Highly Alloyed Stainless Has More Acid Resistance. Helmut Thielsch and W. E. Pratt. *Iron Age*, v. 170, July 10, 1952, p. 135-139.

Discusses above in reference to H_2SO_4. Gives results of corrosion tests. Considers effects of chemical and phase composition on corrosion and gives composition of a number of commercial Cu-bearing stainless steels with high Ni-Cr content. Briefly mentions grain structure. Table, graphs, and micrographs. 11 ref.

10344 A Contribution to the Study of the Action of Certain Inhibitors Upon Corrosion in Chloride-Polluted Water. W. S. Patterson and A. W. Jones, *Journal of Applied Chemistry*, v. 2, May 1952, p. 273-280.

Comparative effects of potassium dichromate, sodium nitrite, sodium benzoate, and soluble oil as corrosion-inhibitors were partially examined. The corrosion media used were NaCl solution or dilute sea water. Tables, photographs, and graphs.

10345 Aluminum Corrosion Prevention. Part 2. Causes and Results of Electrochemical Action Described. George W. Orton. *Light Metal Age*, June 1952, p. 18-20.

Illustrated.

10346 New at B.I.F. 1952: Titanium. *Light Metals*, v. 15, June 1952, p. 192-194.

Exhibit at British Industries Fair. General discussion of Ti and its various properties, stressing corrosion resistance. Large photographic chart shows the relative resistance to corrosion of Ti and other constructional metals. Also a map showing world distribution of Ti-ore deposits.

10347* The Influence of Adsorption Phenomena on the Oxidation of Metals at Elevated Temperatures. (German.) H. J. Engell and K. Hauffe. *Metall*, v. 6, June 1952, p. 285-291.

Discusses the reaction mechanism of oxidation on the basis of the literature, with particular regard to the views advanced by Moore and Lee (*Transactions of the Faraday Society*, v. 47, 1951, p. 501.) Graphs. 19 ref.

10348* The "Inverse Dependence" of the Corrosion of Metals on Some Influencing Factors. (German.) G. Schikorr. *Metall*, v. 6, July 1952, p. 356-360.

Reviews the above on the basis of the literature. Discusses effect of salt concentration, acid concentration, amount of the attacking substance, temperature, precipitation, and composition of the metal. 29 ref.

10349 Influence of Sulphate-Reducing Bacteria on the Corrosion Potential of Iron. J. N. Wanklyn and C. J. P. Spruit. *Nature*, v. 169, May 31, 1952, p. 928-929.

Describes a study of the above made under both autotrophic and heterotrophic conditions using Armco ingot iron. Graph.

10350* A Parabolic Law for Metal Oxidation Which is Not Controlled by Diffusion. W. J. Moore. *Philosophical Magazine*, ser. 7, v. 43, June 1952, p. 688-689.

Brief treatment is given to the above law.

10351. The Resistance of Light Alloys to Marine Corrosion. (French.) Andre Guilhaudis. *Revue de l'Aluminium*, v. 29, Mar. 1952, p. 85-91; Apr. 1952, p. 127-133; May 1952, p. 175-179.

First part describes marine corrosion test stations established at Stalin-de-Giraud and St-Jean-de-Luz by the Service des Recherches et Essais Physiques de Chambery of the Pechiney Company, in France. 2nd part reviews the behavior of unprotected Al and light alloys, Al-Mn, Al-Mg, Al-Mg-Si, Al-Cu-Mg, when submitted to spray, permanent immersion, and alternate immersion-emersion. Points out the influence of work-hardening, Cu, and tension in the case of Al-Mg alloys; of the quenched tempered state in the case of Al-Mg-Si alloys; and of thickness, partial annealing, and orientation of the test piece in the case of Al-Cu-Mg alloys. 3rd part reviews Al-Zn-Mg and Al-Zn-Mg-Cu alloys, and casting alloys; in this latter class, the Al-Mg alloys offer the best resistance. Plating with Al or Al-Zn provides good protection for the alloys A-U4G and A-Z8GU. Resistance to marine corrosion of Cu, Ni, Sn, Zn, ordinary steel for ships' hulls, stainless steel, and brass are also briefly reviewed.

10352* Structure and Corrosion of Al-Mg, and Al-Zn-Mg Alloys. Mechanism of Intergranular Corrosion and Stress

Corrosion. (French.) Pierre A. Jacquet. *Revue de Métallurgie*, v. 49, May 1952, p. 339-363.

The above was investigated on the basis of extensive experiments. Describes in particular preparation of the specimens, and the experimental arrangement. Numerous optical and electron micrographs illustrate results obtained. Also includes tabular and graphical data. (To be continued.)

10353* Study of Variation of the Oxidation Rate of an Al-Mg Alloy With Orientation of the Crystal Structure. (French.) J. Herenguel and P. LeLong. *Revue de Métallurgie*, v. 49, May 1952, p. 374-378.

See similar abstract from *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 232, June 11, 1951, p. 2218-2220.

10354* Investigation of the Formation of Black Stains on the Running Surfaces of Rails. (German.) Walter Jäniche. *Stahl und Eisen*, v. 72, June 19, 1952, p. 758-765; disc., p. 765-766.

Discusses causes of above by accumulation of corrosion products in the depressions. Stained rails were examined to determine influence of nonmetallic inclusions and rupture at the edges due to excessive loads.

10355 Velocity of Action of Oxygen, Hydrogen Sulfide, and Halogens on Metals. G. Tammann and W. Köster. National Advisory Committee for Aeronautics, Technical Memorandum 1339, June 1952, 21 pages. (Translated from *Zeitschrift für anorganische und allegemeine Chemie*, v. 123, Aug. 1922, p. 196-201, 208-224.) (TL570 Un3tm)

Results of investigation of the above are tabulated, charted, and discussed. Fundamental equations of the process are presented. Application to a large number of specific metals and alloys is described.

10356* The Effect of Phase Boundary Reaction in the Oxidation of Metals and Alloys at Higher Temperatures. (German.) K. Hauffe and H. Pfeiffer. *Zeitschrift für Electrochemie; Berichte der Bunsengesellschaft für physikalische Chemie*, v. 56, Apr. 1952, p. 390-398.

Shows, on the basis of experimental results on oxidation of Fe to FeO at 1000°C., and on the sulfurization of Ni to NiS as 670°C., that in these cases, the parabolic time law and the Wagner scaling theory are not applicable, since boundary surface reactions are rate dependent. It is further shown that the presence of metal oxide vapors (MoO_3 and Li_2O) in the oxidizing atmosphere increase the rate of oxidation of metals and alloys, or may decrease it, which is interpreted on the basis of the theory of the formation of defects. Tables and graphs.

10357* The Problem of the Mechanism Determining the Rate of Solution of Metals in Concentrated Acids. (Russian.) Ia. V. Durdin. *Zhurnal Obshchei Khimii*, v. 22(84), Jan. 1952, p. 3-17.

A study was made of the solution of Fe and Cr in HCl and H_2SO_4. Data are tabulated and charted. 14 ref.

Miscellaneous Publications

10358 Report of Committee A-5 on Corrosion of Iron and Steel. American Society for Testing Materials, Preprint 4, 1952, 17 pages. (TA401 Am35p)

Recommendations for revisions in standards, specifications, and test methods. Extensive tabular data on atmospheric corrosion of 22-ga. Cu-bearing, non-Cu-bearing, and galvanized, black, corrugated sheet metal. Specification revisions for Zn-coated sheet steel.

10359 Report of Committee D-19 on Industrial Water. American Society for Testing Materials, Preprint 48, 1952, 19 pages. (TA401 Am35p)

Includes proposed method of sampling steam and water at subatmospheric pressure and proposed corrosivity test for industrial water (USBM Embrittlement Detector Method.)

10360 Atmospheric Corrosion of Low Alloy Steels. H. R. Copson. American Society for Testing Materials, Preprint 70, 1952, 22 pages. (TA401 Am35p)

In 1941 five sets of 71 low-alloy steels were exposed to the industrial atmosphere at Bayonne, N.J., and to the marine atmosphere at Block Island, R.I. Gives complete results through 9 yrs. exposure, including weight losses, pit depths, thickness measurements, calculated pitting factors, and weight of rust on the specimens. Detailed weight loss vs. time curves, pit-depth vs. time curves, and weight-loss vs. composition curves are plotted .

10361. Corrosion Testing: Twenty-Fifth Edgar Marburg Lecture. F. L. LaQue. *American Society for Testing Materials, Proceedings*, v. 51, 1951, p. 495-582. (TA401 Am35p)

Presents an extensive description and discussion of corrosion-test procedures, with numerous typical results described by means of text, tables, graphs, and photographs. Main topics discussed are atmospheric corrosion studies; acid testing; other accelerated tests; relations between rust color and corrosion; effects of position in test; long-time tests of different steels and irons; effects of alloying elements on resistance of steels and irons to atmospheric corrosion; comparison of atmospheres; corrosion tests of insect screens; tests in waters; galvanic corrosion; atmospheric galvanic corrosion tests; salt-spray tests; laboratory total-immersion tests; alternate immersion tests; boiling HNO_3 test; plant corrosion tests; and paint tests. Includes statistical analysis of atmospheric corrosion data on Cu-bearing steels in a marine atmosphere. 95 ref.

10362 The Scaling of Zirconium in Air. C. A. Phalnikar and W. M. Baldwin, Jr. *American Society for Testing Materials, Proceedings*, v. 51, 1951, p. 1038-1059; disc., p. 1059-1060. (TA401 Am35p)

Both O_2 and N_2 enter into the above reaction. It forms a double-layered scale: an outer white or buff scale (monoclinic ZrO_2) that predominates at temperatures below 1050°C. and an inner black scale (monoclinic and tetragonal ZrO_2, cubic ZrN, and possibly N) that occupies the greater thickness at temperatures above 1050°C. The outer white layer does not form immediately but requires a definite time to nucleate. Zr strip also undergoes extraordinary dimensional changes during scaling. Increases in dimensions in the rolling plane trebled the original sample area in some cases. Graphs and photomicrographs. 12 ref.

Books

10363 Korrosionstabellen metallischer Werkstoffe geordnet nach angreifenden Stoffen. (Corrosion Tables of Metallic Materials Arranged According to the Materials Attacked.) Ed. 3V. Franz Ritter. 283 pages. 1952. Springer-Verlag, Vienna, Austria. (TA467 R51k3)

Includes classified list of 991 references from which the data presented were obtained.

See also:

10017 (corrosion resistance of sintered Fe)
10027 (17-Cr steel welds)
10082 (rust-preventive compounds for steel)
10190 (oxide film formation on noble metals)
10219 (corrosion resistance of Al cast iron)
10238 (corrosion resistance of steel pipe)
10243 (scaling behavior of Al bronzes)
10566 (corrosion of Al roofing sheets)
10575 (lead alloys for cables)
10744 (fretting-corrosion studies)

15. ANALYSIS—CHEMICAL AND PHYSICAL

10364 X-Ray Absorption Spectra for Molybdenum in the Compounds $(NH_4)_2MoO_4$, $K_4Mo(CN)_8$, and MoS_2. (Russian.) R. L. Barinskii. *Doklady Akademii Nauk SSSR*, new ser., v. 83, Mar. 21, 1952, p. 381-384.

A theoretical discussion. Graphs.

10365* Standardization of Spectrophotometric Methods for Determination of Polyunsaturated Fatty Acids Using Pure Natural Acids. A. Brice, M. L. Swain, S. F. Herb, P. L. Nichols, Jr., and R. W. Riemenschneider. *Journal of the American Oil Chemists' Society*, v. 29, July 1952, p. 279-287.

Tables and graphs. 22 ref.

10366* A Further Study of the Tetrabromide Method of Estimating Linoleic Acid in Fatty Acid Mixtures With Pentane and Heptane as Solvents. Mary F. White and J. B. Brown. *Journal of the American Oil Chemists' Society*, v. 29, July 1952, p. 292-293.

15. *Analysis—Chemical and Physical*

10367* The Determination of Traces of Arsenic in Germanium Dioxide and Tetrachloride. S. T. Payne. *Analyst*, v. 77, June 1952, p. 278-285; disc., p. 285-287.

The determination of As by a direct Gutzeit test on materials containing Ge is shown to be unsatisfactory. Reproducible results were obtained by extracting the As with a chloroform solution of diethylammonium diethyldithiocarbamate after forming an oxalate-complex with the Ge. Analysis was completed by a modified Gutzeit test.

10368* The Separation and Analysis of Metallic Carbides From Steel. R. Pemberton. *Analyst*, v. 77, June 1952, p. 287-291; disc., p. 291-292.

A technique for isolating the carbide phase from solutions of highly alloyed steels is described and methods for determining the elemental composition of the separated residue are detailed. Procedures are given for determination of C, Mn, Cr, V, Mo, W, Ti, Cb, and Fe in the residue.

10369* Inorganic Chromatography on Cellulose. Part VIII. The Use of a "Compound" Column of Alumina and Cellulose for the Determination of Uranium in Minerals and Ores Containing Arsenic and Molybdenum. W. Ryan and A. F. Williams. **Part IX. The Use of Alumina and Cellulose Adsorbents for the Determination of Thorium and the Simultaneous Determination of Thorium and Uranium in Minerals and Ores.** A. F. Williams. **Part X. The Spectrographic Determination of Micro Quantities of Thorium Separated by Chromatography from Minerals and Ores.** G. W. Kingsbury and R. B. F. Temple. *Analyst*, v. 77, June 1952, p. 293-312; disc., p. 312.

Tables. 19 ref.

10370* The Determination of Total Phosphorus in Soil With Particular Reference to the Control of Interference by Soluble Silica. J. W. Muir. *Analyst*, v. 77, June 1952, p. 313-317.

10371* The Determination of Small Amounts of Bismuth in Lead. C. J. Hall. *Analyst*, v. 77, June 1952, p. 318-321.

Method proposed is based on separation of Bi from Pb by coprecipitating the Bi with MnO_2 in dilute HNO_3 solution, pH 1.0-1.7.

10372* The Colorimetric Determination of Alcohols. V. W. Reid and R. K. Truelove. *Analyst*, v. 77, June 1952, p. 325-328.

The use of ceric ammonium nitrate as a colorimetric reagent for precise determination of various alcohols in dilute aqueous solution is described. The method of determining alcohols when present in certain glycol ethers is stressed. Discusses interferences and methods of overcoming them.

10373* A Spot Test for Cobalt Based on Catalytic Effect. (English.) Philip W. West and Lloyd A. Longacre. *Analytica Chimica Acta*, v. 6, June 1952, p. 485-487.

Based on catalytic effect of Co on oxidation of manganous ion. Involves use of ammonium acetate, butyraldehyde, and Mn(II) ion as reagents. Studies of interferences and sensitivity were made.

10374* Extraction of Bismuth Iodide Complexes as a Spot Test for Bismuth. (English.) Philip W. West, Paschoal Senise, and Jack K. Carlton. *Analytica Chimica Acta*, v. 6, June 1952, p. 488-492.

The test is sensitive to 1γ of Bi, with Pt and Pd constituting the only interferences.

10375* Gasparini's Method for the Determination of Sulphur in Organic Substances by Electro-Oxidation. (English.) Gjorgje Stefanovic and Milutin Stefanovic. *Analytica Chimica Acta*, v. 6, June 1952, p. 506-509.

Above method was checked. It was found that it could replace in all instances the classical method of Carius and that it is simpler and more convenient for serial determination of S in various organic substances.

10376* The Determination of R_f Values of Metallic Ions Using Diethyl Ether as Solvent. (English.) J. R. A. Anderson and Alice Whitley. *Analytica Chimica Acta*, v. 6, June 1952, p. 517-520.

R_f values of some metallic ions were determined by partition chromatography on filter paper, employing as solvents diethyl ether saturated with normal HCl, HBr, H_2SO_4, or HNO_3.

10377* Electro-Chromatography Inside Filter Paper. II. Diffusion and Its Effect on Electrophoretic Separations. (English.) Michael Lederer. *Analytica Chimica Acta*, v. 6, June 1952, p. 521-525.

Measurement of the increase of spot areas of solutions on moistened filter paper was carried out. Results were used to calculate the feasibility of separations by paper electrophoresis, and the method is suggested as a simple technique for measuring relative diffusion rates.

10378* A New Colorimetric Reagent for Zinc. (English.) John H. Yoe and Richard M. Rush. *Analytica Chimica Acta*, v. 6, June 1952, p. 526-527.

Use of o-[a-(2-hydroxy-5-sulfophenylazo)-benzilidene-hydrazino] benzoic acid.

10379* Colorimetric Determination of Copper in Steels by Means of Rubeanic Acid. (French.) Andre Lemoine. *Analytica Chimica Acta*, v. 6, June 1952, p. 528-533.

The method can be used for determination of Cu in steels in the presence of iron and some alloy elements and in different metals and alloys. Accuracy is about ±2.5% of the amount of Cu.

10380* Analysis of Some Electrochemical Processes Related to Coulometric Titrations at Constant Current. (English.) Paul Delahay. *Analytica Chimica Acta*, v. 6, June 1952, p. 542-552.

By considering the equilibrium potentials for the various electrode reactions which may occur in a coulometric titration, it is possible in certain cases to shorten the experimental exploratory work involved in development of a new titration. Titration of trivalent As by generated Br and of dichromate by generated monovalent Cu are treated as examples. Possible consequences of irreversibility of electrode processes are examined. An analysis of the stability of the various chlorocomplexes of mono- and divalent Cu is made. 20 ref.

10381* Applications of Amperometric Titrations to Microanalysis. (English.) Thomas D. Parks. *Analytica Chimica Acta*, v. 6, June 1952, p. 553-566.

Gives examples of several different types of amperometric titrations, including use of inorganic and organic reagents at the dropping mercury electrode and of cathodic and anodic titrations at the rotating platinum electrode. Oxidation-reduction reactions, precipitation reactions, and complex-formation reactions are illustrated. Several methods are presented including determination for halogens in organic compounds, sulfur in organic compounds, and many inorganic ions. 26 ref.

10382 A Century of Colorimetry. M. G. Mellon. *Analytical Chemistry*, v. 24, June 1952, p. 924-931.

The Fisher Award address. 128 ref.

10383 Ultraviolet Spectrophotometric Determination of Cobalt With Peroxide and Bicarbonate. George Telep and D. F. Boltz. *Analytical Chemistry*, v. 24, June 1952, p. 945-947.

Table and spectrograms. 13 ref.

10384 Spectrophotometric Determination of Titanium With Ascorbic Acid. Edward Hines and D. F. Boltz. *Analytical Chemistry*, v. 24, June 1952, p. 947-948.

Describes method suitable for the determination of 0.1-25 ppm. Ti. Spectrogram and table. 15 ref.

10385 Spectrophotometric Determination of Palladium With Bromide. Gilbert H. Ayers and Bartholomew L. Tuffly. *Analytical Chemistry*, v. 24, June 1952, p. 949-952.

Describes method which should be especially suitable for analysis of high-Pd alloys. Optimum range is about 40-200 ppm. of Pd. Spectrogram and tables. 10 ref.

10386 Determination of Alkali Metals in Insoluble Silicates by Ion-Exchange Chromatography. Richard C. Sweet, William Rieman III, and John Beukenkamp. *Analytical Chemistry*, v. 24, June 1952, p. 952-955.

Tables and graphs. 11 ref.

10387 Separation and Identification of Polymethylol Phenols by Paper Chromatography. J. H. Freeman. *Analytical Chemistry*, v. 24, June 1952, p. 955-959.

Useful in the study of the phenolic resinification process. Photograph, tables, and chromatograms. 25 ref.

10388 Partition Chromatography of Aliphatic Acids. F. A. Vandenheuvel. *Analytical Chemistry*, v. 24, June 1952, p. 960-965.

A new multicolumn technique allows separation of monocarboxylic acids from C_2 to C_{12}; and with only a modification of the column-mixture composition, dicarboxylic acids from C_4 to C_{10}. Recoveries are often better than 95%. Apparatus diagrams and tables. 10 ref.

10389 Dielectric Indicator for Column Chromatography. Donald E. Laskowski and Richard E. Putscher. *Analytical Chemistry*, v. 24, June 1952, p. 965-969.

Describes adaptation of the Thermocap relay for detection of colorless components in the effluent stream of a chromatographic column. Spectrograms, chromatograms, and circuit diagrams.

10390 Some Aliphatic Nitro Compounds and n-Butyl Nitrate in Nonaqueous Solvents. Nathan Radin and Thomas de Vries. *Analytical Chemistry*, v. 24, June 1952, p. 971-973.

Shows utility of polarographic method with nonaqueous solvents. Tables and polarogram. 10 ref.

10391 Reproducible Platinized Platinum Electrode for Anodic Polarography. William M. MacNevin and Michael Levitsky. *Analytical Chemsitry*, v. 24, June 1952, p. 973-975.

A study of factors involved in production of the above, with a description of the preparation method adopted. Tables.

10392 2-(o-Hydroxyphenyl)-Benzoxazole as a Reagent for Gravimetric Determination of Cadmium. Joseph L. Walter and Henry Freiser. *Analytical Chemistry*, v. 24, June 1952, p. 984-986.

Tables and graph.

10393 Primary Coulometric Determination of Iron (II) and Arsenic (III). William M. MacNevin and Bertsil B. Baker. *Analytical Chemistry*, v. 24, June 1952, p. 986-989.

Fe and As were determined using a H_2-O_2 coulometer, with a relative accuracy of about 1%. A new method for current summation obviates the necessity of running the electrolysis to completion. Apparatus diagram and graph.

10394 Mercurimetric Determination of Chlorides and Water-Soluble Chlorohydrins. William G. Domask and Kenneth A. Kobe. *Analytical Chemistry*, v. 24, June 1952, p. 989-991.

Method described has advantage of a clear solution at the end point, and does not require a blank determination or correction for complexes. 16 ref.

10395 Small Amounts of Copper in Dyes and Rubber Chemicals; Colorimetric Determination With Zinc Dibenzyldithiocarbamate. R. I. Martens and R. E. Githens, Sr. *Analytical Chemistry*, v. 24, June 1952, p. 991-993.

Describes a colorimetric method using Zn dibenzyldithiocarbamate which will selectively extract Cu from acid solutions containing relatively large amounts of most other metals. It is accurate and reproducible to about 0.5 microgram in the range 0.5-40 micrograms of Cu. Tables.

10396 Microdetermination of Chromium With Diphenylcarbazide by Permanganate Oxidation. Bernard E. Saltzman. *Analytical Chemistry*, v. 24, June 1952, p. 1016-1020.

Describes an improved colorimetric method with a sensitivity of 0.03 μg. of Cr in a volume of 25 ml. The method should be applicable in many fields. Tables. 12 ref.

10397 Specific Spot Test for Antimony. Philip W. West and William C. Hamilton. *Analytical Chemistry*, v. 24, June 1952, p. 1025-1026.

Consists of a benzene extraction of the Sb (III) iodide, with Rhodamine B then added to the benzene layer as the color-developing reagent.

10398 Dimethylglyoxime for Determination of Nickel in Large Amounts. E. L. Bickerdike and H. H. Willard. *Analytical Chemistry*, v. 24, June 1952, p. 1026.

10399 Rapid Magnesium Determination in Cement Manufacture in Sweden. K. G. Kawe Andersson. *Analytical Chemistry*, v. 24, June 1952, p. 1028-1029.

A colorimetric method which reveals both the carbonate and silicate compounds of Mg. Tables and graphs.

10400 Preparation of Standard Sodium Hydroxide Solutions by Use of a Strong Anion Exchange Resin. John Steinbach and Henry Freiser. *Analytical Chemistry*, v. 24, June 1952, p. 1027-1028.

10401 Adaptation of Photomultiplier to Beckman DU Spectrophotometer. H. B. Collier and R. P. Barschel. *Analytical Chemistry*, v. 24, June 1952, p. 1030-1031.

Describes above to gain increased sensitivity and to permit use of narrower slit widths in flame photometry and reflectance measurements. Photograph and tables.

10402 Homogeneous Precipitation of Barium Sulfate by Hydrolysis of Sulfamic Acid. W. F. Wagner and J. A. Wuellner. *Analytical Chemistry*, v. 24, June 1952, p. 1031-1032.

Experimental data on above procedure useful in determination of Ba.

10403 Some Analytical Properties of 8-Hydroxyquinaldine. J. P. Phillips, J. F. Emery, and H. P. Price. *Analytical Chemistry*, v. 24, June 1952, p. 1033-1034.

A study of the bromination of 8-hydroxyquinaldine and its reactions with some of the trivalent elements and heavy metals. Also describes synthesis of the reagent and determination of it and related compounds. Tables.

10404 Attainment of High Resolution in X-Ray Fluorescent Analysis. Ruben M. Brissey. *Analytical Chemistry*, v. 24, June 1952, p. 1034-1035.

Describes a simplified method using a General Electric XRD-3 Fluorescent Analyzer applicable when elements such as mixtures of Mo, Cb, Ta, and W, are analyzed. Tables and radiation curves.

10405 Iodometric Codetermination of Copper and Iron. Robert C. Brasted. *Analytical Chemistry*, v. 24, June 1952, p. 1040-1041.

Tables. 10 ref.

10406 Improved Constant-Current Supply for Coulometric Analysis. Charles N. Reilley, Ralph N. Adams, and N. Howell Furman. *Analytical Chemistry*, v. 24, June 1952, p. 1044-1045.

Circuit diagram and table.

10407 Determination of Vanadium in Fuel-Oil Ash. G. L. Hopps and A. A. Berk. *Analytical Chemistry*, v. 24, June 1952, p. 1050-1051.

Tables and standardization curve.

10408 Instrumental Detection of Radioactive Material on Paper Chromatograms. A. Russell Jones. *Analytical Chemistry*, v. 24, June 1952, p. 1055.

Describes a modification of the Müller and Wise method for direct scanning and recording in connection with the above. The change employs a novel pickup and a vibrating-reed electrometer. Chart and photograph.

10409 Photometric Determination of Beryllium in Beryllium-Copper Alloys. C. L. Luke and Mary E. Campbell. *Analytical Chemistry*, v. 24, June 1952, p. 1056-1057.

Describes above method for 2% Be-Cu alloys using ethylenediamine tetraacetic acid as a masking agent and an aluminon-buffer composite solution. Tables.

10410 Millicoulometric Redox Titrations. Louis Meites. *Analytical Chemistry*, v. 24, June 1952, p. 1057-1059.

Gives general discussion of above titrations and describes apparatus for making them. Illustrates technique by an account of a Ce (IV) titration. Tables and graph. 22 ref.

10411 Extraction and Determination of Plasticizers from Cellulose Acetate Plastics. Gerald C. Whitnack and E. St.

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Clair Gantz. *Analytical Chemistry*, v. 24, June 1952, p. 1060-1061.
Photograph and tables.

10412 Volumetric Determination of Nickel in Steel. William F. Harris and Thomas R. Sweet. *Analytical Chemistry*, v. 24, June 1952, p. 1062-1063.
An improved method in which Ni separated by dimethylglyoxime precipitation is titrated with Versenate in presence of the dye murexide. Table. 10 ref.

10413 Determination of Phosphate by Ion Exchange. Alexander J. Goudie and Wm. Rieman III. *Analytical Chemistry*, v. 24, June 1952, p. 1067-1068.

10414 Determination of Soap, Acid, and Alkali in Synthetic Latices. S. H. Maron, I. N. Ulevitch, and M. E. Elder. *Analytical Chemistry*, v. 24, June 1952, p. 1068-1070.
Describes conductometric procedures for determination of above constituents in synthetic rubber latices. Tables and graphs.

10415 Exaltation of the Limiting Current of Oxygen by Hydrogen Peroxide at the Rotated Gold Electrode as a Means for Amperometric Determination of Traces of Oxygen. I. M. Kolthoff and Joseph Jordan. *Analytical Chemistry*, v. 24, June 1952, p. 1071-1072.

10416* Paper Chromatography of Some Enzymes and the Plasma Proteins. (English.) E. Cabib. *Biochimica et Biophysica Acta*, v. 8, June 1952, p. 607-614.
Two enzymes, phosphoglucomutase and invertase, were separated by paper chromatography, using ethanol-buffer mixtures as solvents. Under the same conditions, invertase from brewer's yeast gave two peaks of activity. Separation between albumin and the globulin fraction of various sera was carried out with ethanol-water and ethanol-buffer mixtures. The effect of changing alcohol concentration and pH of the solvent was investigated. 24 ref.

10417* The Use of an Auto-Recording Photoelectric Spectrograph for Analyzing Biological Materials. (Russian.) I. A. Terskov. *Biokhimiia*, v. 17, Mar.-Apr. 1952, p. 154-160.
Describes and diagrams above apparatus and its operation. Samples of typical records are illustrated.

10418 The Estimation of Free Amino Acids Using a Microdiffusion Technique. W. B. McConnell. *Canadian Journal of Chemistry*, v. 30, July 1952, p. 522-528.

10419* The Spectrophotometric Determination of the Hydroxyl Contents of Aliphatic and Alicyclic Alcohols. J. P. Riley. *Journal of the Chemical Society*, June 1952, p. 2108-2110.

10420* The Analysis of Pyridine Bases From Coal Tar by Infra-Red Absorption Spectroscopy. A. B. Densham, D. J. Langston, and G. Gough. *Journal of the Chemical Society*, June 1952, p. 2433-2435.

10421* Substituted Benzidines and Related Compounds as Reagents in Analytical Chemistry. Part X. The Titration of Small Amounts of Gallium. R. Belcher, A. J. Nutten, and W. I. Stephen. *Journal of the Chemical Society*, June 1952, p. 2438-2439.

10422* Thorium Nitrate Titration Method for the Estimation of Fluorine. Parts I and II. T. K. Wadhwani. *Journal of the Indian Institute of Science*, v. 34, sec. A., Apr. 1952, p. 123-147.
17 references.

10423* Photo-Electric Colorimetric Method for the Estimation of Fluorine. T. K. Wadhwani. *Journal of the Indian Institute of Science*, v. 34, sec. A., Apr. 1952, p. 149-157.
The method is based on the bleaching effect of fluorine on the color produced as a result of reaction between ferrous and ferric chloride. Accuracy is compared with that obtained in thorium nitrate titration method.

10424 Analytical Methods Used in Air Pollution Study. Kingsley Kay. *Industrial and Engineering Chemistry*, v. 44, June 1952, p. 1383-1388.
Literature review. 102 ref.

10425 Intensity Calculation for Determining Weight Percentage in a Binary Alloy by X-Ray Fluorescent Analysis. P. K. Koh, B. Caugherty, and R. E. Burket. *Journal of Applied Physics*, v. 23, June 1952, p. 698.
In reference to above describes a simple calculation applicable when the binary alloy consists of neighboring elements in the periodic table. Example is given for an Fe-Co alloy. Table.

10426* Anion Exchange Chromatography of Acids of the Citric Acid Cycle. Harris Busch, Robert B. Hurlbert, and Van R. Potter. *Journal of Biological Chemistry*, v. 196, June 1952, p. 717-727.
Method described was found suitable for 90-100% recovery of a number of common organic acids in above cycle. Graphs and tables. 19 ref.

10427* Riboflavin in Human Serum. K. Suvarnakich, G. V. Mann, and F. J. Stare. *Journal of Nutrition*, v. 47, May 10, 1952, p. 105-118.
A study of the above by a microfluorometric method. Tables. 23 ref.

10428 Power Supply for a Thermionic Ion Source. C. Reuterswärd. *Journal of Scientific Instruments*, v. 29, June 1952, p. 184-185.
Characteristics and details of a regulated a.c. generator are given by means of which ion currents constant to some tenths of a percent are obtained for mass spectroscopic investigations. Includes background and operational information. Circuit diagram.

10429 Apparatus for Conversion of Infra-Red Spectrometer Records to Percentage Transmission. R. A. G. Carrington and J. G. Reynolds. *Journal of Scientific Instruments*, v. 29, June 1952, p. 197-199.
Photographs and charts.

10430 A Combustion Chamber for the Semi-Micro Determination of Carbon Monoxide and Hydrogen. G. T. Rogers. *Journal of Scientific Instruments*, v. 29, June 1952, p. 201.
Describes and illustrates a simple apparatus for mixtures which do not contain hydrocarbons, suitable for handling samples of about 0.4 cc.

10431 Determination of Iron, Nickel and Manganese in Copper-Base Alloys. N. M. Silverstone and D. W. D. Showell. *Metal Industry*, v. 80, June 6, 1952, p. 467-469.
Describes above, using photometric procedures. A composite scheme is also given for determination of the 3 elements in a single sample.

10432 Rapid Photometric Determination of Cobalt in Aluminium Alloys Using Nitroso-R-Salt. William Stross and Gertrude Stross. *Metallurgia*, v. 45, June 1952, p. 315-318.
It was found that the method of Haywood and Wood for determining Co in steel can be applied to Al alloys with only minor adjustments. An even simpler procedure is described here which also has the advantage of enabling the determination of Co to be combined with that of Cu, Ni, and Fe from aliquots of the same metal solution. Calibration graph. 20 ref.

10433 Determination of Aluminium in Aluminium Bronzes Conforming to Specification D.T.D. 197. G. H. R. Gwatkin. *Metallurgia*, v. 45, June 1952, p. 319-321.
A method is proposed for routine determination of the above with an accuracy of about ±1%.

10434 Analysis of Silver Solder. R. W. C. Broadbank. *Metallurgia*, v. 45, June 1952, p. 321.
Brief description of electrodeposition method for above for determination of Ag, Cu, Cd, and Zn. First 3 are deposited from perchloric acid solution. Table.

10435 Arc Spectra of Gallium, Indium, and Thallium. William F. Meggers and Robert J. Murphy. *Journal of Research*

of the National Bureau of Standards, v. 48, Apr. 1952, p. 334-344.
Above were systematically investigated photographically in the octave 6500 to 13000 A. The spectra were excited in d.c. arcs and recorded on infrared-sensitive photographic emulsions with a concave diffraction grating 22 ft. in radius. 17 ref.

10436 A Technique for the Identification of Amino-Acids Separated by Circular Paper Chromatography. K. V. Giri and N. A. N. Rao. *Nature*, v. 169, May 31, 1952, p. 923-924.
Describes a new technique, which permits identification of amino-acids by reference to the chromatogram of known amino-acids run on the same paper.

10437* Double Zoning and the Homogeneity Test in Column Chromatography. T. C. J. Ovenston. *Nature*, v. 169, May 31, 1952, p. 924-925.
Discusses some conditions conducive to double zoning and mentions some limitations of the homogeneity test.

10438* Technique of Preparation and Mounting of Crystals for Analytical X-Ray Diffraction Studies. (Spanish.) I. Asensio Amor. *Nucleo*, v. 7, May 1952, p. 186-190.
Reviews the above on the basis of the literature. Discusses in particular the case in which the substance is placed in a capillary tube; where the substance must adhere to the capillary tube; and where the substance is placed in special devices. 54 ref.

10439 On the Arc Spectra of Boron, Indium, Thallium, Lead, and Bismuth. H. E. Clearman. *Journal of the Optical Society of America*, v. 4, June 1952, p. 373-379.
Observations were made between 1200-2000A on the above. Results are discussed and tabulated.

10440 Some Applications of Photomultiplier Tubes to Spectrographic Analysis. James K. Brody. *Journal of the Optical Society of America*, v. 42, June 1952, p. 408-415.
A mounting for 2 photomultiplier tubes for the Baird spectrograph is described. The equipment was used in 3 analytical problems: determination of Li in the flame, uranium isotopic determinations using the hollow cathode and spark, and Cu spark determination of Sc. Tables and graphs.

10441 Free Sulfur Determination Reduced to 15 Minutes by New Method. O. R. Mitchell. *Petroleum Refiner*, v. 31, June 1952, p. 148.
Describes modification of the method used by Uhrig and Levin. Turbidity resulting from reaction with metallic Hg is used as a measure of free S.

10442 The Use of Spectral Methods for the Analysis of Plants and Soils. (Russian.) L. I. Obolenskaia. *Pochvovedenie*, Mar. 1952, p. 278-286.
Spectrographic determination of K, Na, Ca, and Mn in plants and in soils. Experimental data are tabulated.

10443* The Analytical Determination of the Total Iron Oxide and Ferrous Oxide Contents of Glasses. R. S. Allison. *Journal of the Society of Glass Technology* (Transactions Section), v. 36, Apr. 1952, p. 124-130.
The above was determined using a modified form of the Densem method which gave accurate and reproducible results. A method for determination of total iron was evolved using the same sample of glass. A method was devised whereby Fe_2O_3 in glasses was determined directly, and FeO obtained by difference. Tables.

10444* A Spectrographic Modification of the Variable Internal Standard Method. (English.) J. R. Butler and H. H. LeRiche. *Spectrochimica Acta*, v. 4, no. 6, 1952, p. 435-438.
A method is described for simultaneous determination of a trace element and its variable internal standard with particular reference to Fe and the cathode-layer arc. The spectrogram from a burn of the sample mixed with carbon is prepared with one from a burn of the sample mixed with a carbon-Fe_2O_3 mixture.

10445* The Spectrographic Determination of Metallic Constituents in Petroleum Ash. (English.) Leon W. Gamble and Curtis E. Kling. *Spectrochimica Acta*, v. 4, no. 6, 1952, p. 439-445.
Arc spectra of powdered samples on carbon electrodes and a grating spectrogram were used for estimation of Fe, Al, Si, Mn, Mg, V, Ni, Na, and Ca in petroleum ash. A spectroscopic buffer of lithium carbonate was used; and the method was calibrated with synthetic standards. Wave lengths used are tabulated; standard deviation of precision is indicated. 11 ref.

10446* A Step-Sector for Use With Intermittent Light Sources. (English.) Ralph E. Thiers. *Spectrochimica Acta*, v. 4, no. 6, 1952, p. 467-471.
Tests are described on the "focal plane" step-sector with intermittent source units. This sector consists of a band of jet-black film with stepped shapes cut from it. By making the spacing between the shapes irregular, a more random sample of the exposure time is taken than with a disk-type sector. This sector eliminated troubles due to stroboscopic effect and could be used with intermittent and interrupted light sourecs.

10447* A New Electrode Holder for Running a Carbon Arc in an Inert Atmosphere. (English.) G. W. J. Kingsbury and R. B. Temple. *Spectrochimica Acta*, v. 4, no. 6, 1952, p. 473-475.
Two new types are described which allow a carbon arc to be run in a stream of CO_2, in order to diminish intensity of the atmospheric CN bands which might otherwise mask the lines of certain elements. It has also been found that an increase in accuracy may be obtained for certain analyses by using these holders to circulate a stream of air around the arc.

10448* A Method for Determination of Dissolved Aluminium and Alumina in Steel. (English.) S. Muir and A. D. Ambrose. *Spectrochimica Acta*, v. 4, no. 6, 1952, p. 482-488.
A part chemical and part spectrographic method is described for the above. Tables and graphs.

10449* Spectrochemical Analysis of Steelmaking Slags. (French.) René Castro and René Loude. *Spectrochimica Acta*, v. 4, no. 6, 1952, p. 496-512.
Standard samples were prepared by sintering mixtures of the constituents in definite proportions. These sintered standards give similar spectra to those obtained from fused slags of the same composition; and have therefore made it possible to explore the effect of interfering elements on others and to complete a range of standard samples corresponding to the normally made slags. Two methods of carrying out the analysis are described; in each case the samples are made of pressed pellets of a mixture of the slag with Ni powder.

10450* An Apparatus for Quantitative Spectrographic Analysis in Controlled Atmospheres. (English.) R. St. J. Emery. *Spectrochimica Acta*, v. 4, no. 6, 1952, p. 513-515.
Describes, diagrams, and illustrates apparatus enabling small samples of metal to be analysed spectrographically in any selected single gas or mixture of gases. The apparatus may also be used for analysis at reduced pressures.

10451* The Applicability of Several Methods to the Determination of Phosphoric Acid in Water and Aqueous Solutions. (German.) Alwin Schleider and Josef Bochem. *Fresenius' Zeitschrift für analytische Chemie*, v. 136, no. 1, 1952, p. 4-17.
Describes critical study of 9 different analytical methods. 12 ref. Tables and graphs.

10452* Separation of Molybdenum From Heavy Metals With the Aid of Ion-Exchange Resins. (German.) Robert Klement. *Fresenius' Zeitschrift für analytische Chemie*, v. 136, no. 1, 1952, p. 17-25.
A method extracting Mo from Cu, Pb, Cr, Ni, Fe, and V is described and illustrated. It was found to be rapid and reliable. Graphs. 10 ref.

Miscellaneous Publications

10453 Identification of Clay Minerals by Staining Tests. Richard C. Mielenz and Myrle E. King. *American Society for Testing Materials, Proceedings*, v. 51, 1951, p. 1213-1233. (TA401 Am35p)
Staining tests make possible rapid identification of clay minerals in soils and rocks. Two types of reactions are indicated: acid-base reactions in which stains act as indicators of pH in adsorbed water films; and oxidation-reduction reactions in which certain aromatic amines are partially oxidized, with production of characteristically colored forms. Procedures, applications, and limitations of the methods are indicated. Data regarding adsorp-

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tion of dyes by clays and mechanisms of the staining reactions are summarized.

10454 Contribution to Rapid Determination of Copper in Steel. W. Koch and K. Behrens. Henry Brutcher, Translation 2864, 6 pages. (From *Archiv für das Eisenhüttenwesen*, v. 23, Jan.-Feb. 1952, p. 35-36.)

Previously abstracted from original.

10455 Physiochemical Analyses in Analytical Chemistry. (Russian.) I. V. Tananaev. "Izvestiia Sektora Fiziko-Khimicheskogo Analiza", v. 20 (Academy of Sciences of the USSR), p. 277-293. (QD453 Ak13i)

A theoretical discussion of the above. Includes solubilities, light absorption, electrometric measurements, pyrometry, and measuring apparent volumes of precipitates. 22 ref.

10456 The Time Factor in Physiochemical Analysis. (Russian.) I. I. Kornilov. "Izvestiia Sektora Fiziko-Khimicheskogo Analiza", v. 20 (Academy of Sciences of the USSR), p. 294-304. (QD453 Ak13i)

Discusses the above with particular emphasis on the analysis of systems which are not in equilibrium. 35 ref.

Books

10457 Poisons; Their Isolation and Identification. Ed. 3. Frank Bamford and C. P. Stewart. 316 pages. 1951. Blakiston Co., Philadelphia. (RA1211 B21p3)

Intended as a laboratory manual for all chemists who have to deal with cases of poisoning. Chap. X gives a systematic scheme for identification of the alkaloids.

10458 Probit Analysis; A Statistical Treatment of the Sigmoid Response Curve. Ed. 2. D. J. Finney. 318 pages. 1952. University Press, London. (SB951 F49p2)

Discusses and explains a branch of statistical study, of recent and rapid growth, and now widely used in connection with biological essay of insecticides, fungicides, drugs, vitamins, etc. It standardizes the method and makes its practice applicable for the biologist without statistical training; and also indicates main outline of underlying mathematical theory.

10459 Absorptions-Spektralanalyse. (Absorption Spectroscopy.) Franz X. Mayer and Alfred Luszczak. 238 pages. 1951. Walter de Gruyter & Co., Berlin, Germany. (QC437 M45a)

Discussion of history, theory, and practice of above is demonstrated by numerous practical examples. Photographs, diagrams, tables, and graphs. 36 ref.

10460 Chemical Analysis of Cast Iron and Foundry Materials. W. Westwood and A. Mayer. 565 pages. 1951. George Allen and Unwin, Ltd., London, England. (QD133 W52c)

Deals with the chemical analysis of all metals encountered in modern iron-foundry practice. Method of determination of each element is prefaced by a survey of available methods, with extensive references to the most recent work, followed by theoretical considerations. Practical hints, time required, methods of calculation, and range and accuracy are given for each method. Also describes sampling and analysis of slags, silica, coal and coke, oils, and binders.

10461 Symposium on Flame Photometry. 120 pages. 1952. American Society for Testing Materials, Philadelphia. (Special Technical Publication 116.) (QC391 Am35s)

Introduction by R. O. Clark and L. R. Pritchard, plus the following papers and specific and general discussions: "A Review of Flame Photometry", V. M. Meloche; "A Stable Internal Standard Flame Photometer for Sodium, Potassium, Lithium and Calcium Analyses in Biological Fluids and a Study of Ion Interference", C. L. Fox, Jr., Elizabeth B. Freeman, and Sigmund Lasker; "Use of the Beckman and Perkin-Elmer Flame Photometers for the Determination of Alkalies in Portland Cement", J. D. Diamond and Leonard Bean; "Applications of Flame Photometry for the Analysis of Alkalies in Silicates, Waters, and Metals", J. L. Gilliand; "The Determination of Lithium Oxide in Portland Cement by Flame Photometer", W. J. McCoy and G. G. Christiansen; "Control of Interferences Caused by Acids and Salts in the Flame Photometric Determination of Sodium and Potassium", Frank T. Eggertsen, Gerrard Wyld, and Louis Lykken; "The Effect of Organic Solvents on the Flame Photometric Emission of Certain Elements", G. W. Curtis, H. E. Knauer, and L. E. Hunter; "Determination of Tetraethyllead in Gasoline by Flame Photometry", P. T. Gilbert, Jr.; "Determination of Calcium in Lubricating Oil by Flame Spectrophotometer", M. L. Moberg, V. B. Waithman, W. H. Ellis, and H. D. Dubois; "A Modified Recording Flame Photometer", W. H. King and William Priestley, Jr.; "Flame Photometer in the Analysis of Water and Water-Formed Deposits", R. K. Scott, V. M. Marcy, and J. J. Hronas.

10462 Methods of Vitamin Assay. Ed. 2. 301 pages. 1951. Interscience Publishers Ltd., London. (QP801.V5 As78m2)

First edition has been revised to incorporate pertinent information from the current literature as well as modifications in procedure suggested by users. Assays are now included for panthothenic acid, pyridoxine, folic acid, biotin, vitamin B_{12}, and niacin. These changes and additions have increased the size of the book by more than half. Chapter bibliographies.

See also:
9915 (Lazarus Ercker's Treatise on Ores and Assaying)
10106 (microanalysis in metallurgy: German Work)
10591 (radioactive contaminants in water)
10904 (polarography of iodonium salts)
11111 (paper chromatography of natural resins)

16. APPARATUS, METHODS, AND STANDARDS

10463* The Filtration of Fine Particles: An Analysis of Filter Performance With an Account of Test Methods. R. W. Cranston. *Aircraft Engineering*, v. 24, June 1952, p. 154-159.

Divided into 2 parts: Part I contains an analysis of the action of fine-particle filters, and indicates their fundamental parameters, showing how these may be measured. Part II deals with the experimental evaluation of fine-particle filters. Graphs and apparatus diagrams.

10464* An American Method of Photographing Flow Patterns. *Aircraft Engineering*, v. 24, June 1952, p. 164-169.

Describes above, a smoke-tunnel method, and illustrates results with numerous photographs.

10465* A Rigorous, Simple Method of Measuring and Recording Particle-Size Distribution in Dispersed Material. M. Rim. *Transactions, American Geophysical Union*, v. 33, June 1952, p. 423-426.

In apparatus described, only external measurements (buoyancy) need be taken on a column of settling particles, and stability is maintained by use of an additional liquid. The design is simple enough for routine determinations. It is combined with a bead-recorder, necessitating no photographic work and almost no mechanical parts. Diagrams.

10466 Hot-Wire Manometers for Chemical Applications. Hans Von Ubisch. *Analytical Chemistry*, v. 24, June 1952, p. 931-938.

Summarizes an investigation made to improve hot-wire manometry, with emphasis on the micron and lower millimeter range. Procedures and formulas for precision manometry on pure gases and on binary mixtures, together with manometric constants for 19 gases, are given. Considers gage design and prediction of response for untested gases. Graphs, tables, and circuit and apparatus diagrams. 13 ref.

10467 Measuring Specific Heat of Liquids at High Temperatures. Norman H. Spear. *Analytical Chemistry*, v. 24, June 1952, p. 938-941.

Describes a twin-radiation-tube calorimeter capable of measuring specific heat of nonmetallic liquids at constant pressure in the range 100-300°C., utilizing liquid volumes on the order of 50 ml., and with an accuracy better than 5%. Apparatus, diagrams, and graphs.

10468 Detection and Measurement of Aerosol Particles. Bernard Vonnegut and Raymond Neubauer. *Analytical Chemistry*, v. 24, June 1952, p. 1000-1005.

Describes method utilizing a small electrically-heated filament for counting and giving a qualitative estimate of the size of

aerosol particles of H_2O and other vaporizable substances. Also describes a method for producing highly uniform drops of about 8-micron radius and larger—for calibration purposes. Apparatus drawings, circuit diagrams, and graphs.

10469 Evaluation of Several Types of Replicas. J. J. Comer and F. A. Hamm. *Analytical Chemistry*, v. 24, June 1952, p. 1006-1015.

Deals with preparation of substrates for high resolution electron microscopy. Includes a comparison of one-step silica and 2-step polystrene-silica replicas. Numerous electron micrographs. 17 ref.

10470 Modified Method for Viscosity Measurement of Small Samples. J. G. Lillard. *Analytical Chemistry*, v. 24, June 1952, p. 1042-1043.

Results indicate that the modified procedure will enable determination of viscosities within the lubricating-oil range, from 100 to 210°F. with an average accuracy of ±1.0% and will permit calculation of viscosity with an average accuracy of ±3 units. Tables and apparatus diagrams.

10471 Application of Mohr-Westphal Balance to Rapid Calibration of Wide Range Density-Gradient Columns. F. M. Richards and T. E. Thompson. *Analytical Chemistry*, v. 24, June 1952, p. 1052-1053.

Table and apparatus diagrams.

10472* Analytical Application of the Absorption Spectra of the Halide Complexes of Heavy Metals. I. Spectrophotometric Determination of Iron With Hydrochloric Acid. (English.) M. A. Desesa and L. B. Rogers. *Analytica Chimica Acta*, v. 6, June 1952, p. 534-541.

12 references.

10473* Ultrasonic Image Conversion by Means of a Thermally Produced Color Change. (German.) Hans Heinrich Rust. *Angewandte Chemie*, v. 64, June 7, 1952, p. 308-311.

Describes new technique for ultrasonic radiography (nondestructive testing). Ultrasonic heat of absorption is utilized for image conversion, color changes being produced by "thermochromes". Silver tetraiodomecurate is applied in a thin layer to acetylcellulose foil, thereby producing a highly sensitive ultrasonic "exposure material" analogous to photographic film. Illustrated.

10474* Determination of Pressure-Time Curves of the Shock Wave by a New Method. C. O. Criborn. *Applied Scientific Research*, v. 3, sec. A, no. 3, 1952, p. 225-236.

Method is based on the pressure sensitivity of a corona discharge. Article covers principles, construction, calibration, and properties. Photographs, graphs, and diagrams.

10475* Process and Apparatus for the Measurement of Very-Small Gas Pressures. IV. Ionization Manometer. Choice of a Manometer. (German.) Helmut Schwarz. *Archiv für technisches Messen*, May 1952, p. 99-102.

Describes types of ionization manometers which have proven satisfactory in practice. Advantages and disadvantages of the various types are indicated. Drawings and graphs.

10476* The Electric Strain Gage as a Problem in Electrical Measuring Technique. (German.) Christof Rohrbach. *Archiv für das Eisenhüttenwesen*, v. 23, May-June 1952, p. 239-243.

Presents comparative review of methods and apparatus for the above. Diagrams and photographs.

10477* Testing of Material With Gamma and Beta Rays. I. Radioactive Materials and Their Physical Properties. (German.) E. A. W. Müller. *Archiv für technisches Messen*, June 1952, p. 127-130.

Reviews the above on the basis of the literature. Discusses particularly natural and synthetic radioactive materials. Table gives properties of isotopes applicable to testing of materials. 49 ref.

10478 No Tubes Used in Heat-Control System. Philip Klass. *Aviation Week*, v. 57, July 7, 1952, p. 52, 54, 56, 58.

Unique pulsing-type temperature control system, recently developed by Barber-Colman-Co., has gone into use in a variety of new military aircraft. It is called Micropulse. A surprising feature is that it uses no vacuum tubes. Circuit diagrams.

10479* Electron Microscopic Study of Sintering in Thermistor Flakes. *Bell Laboratories Record*, v. 30, July 1952, p. 285-287.

A new type of thermistor element, called a thermistor flake, was recently developed for applications requiring both large thermistor surface area and quick response to temperature change. It was believed that their noise characteristics might be improved by modifying the sintering treatment used in their manufacture. To determine the best method of treatment, the surface of the flakes was studied with an electron microscope after sintering to various temperatures. Some of the resulting photomicrographs are shown.

10480* Errors in Stress Determination at the Free Boundaries of "Frozen Stress" Photoelastic Models. V. M. Hickson. *British Journal of Applied Physics*, v. 3, June 1952, p. 176-181.

Lists above errors and estimates magnitude of some. Particular regard is paid to the important case of a stress concentration, where small radii will introduce errors negligible at other points on the boundary. Diagrams.

10481* The Solution of Temperature Distribution Problems by Computation and Electrical Analogy. J. C. Williams and James A. Jobling. *British Journal of Applied Physics*, v. 3, June 1952, p. 197-199.

Compares above methods for solids and discusses application of both methods to the solution of industrial problems involving conduction in one, two, or three dimensions, with heat losses from surfaces. Diagrams.

10482 A Rapid Ultrafiltration Apparatus. I. W. Coleman. *Canadian Journal of Medical Sciences*, v. 30, June 1952, p. 246-249.

Apparatus for preparation of protein-free filtrates of biological fluids for subsequent amino-acid analysis by paper chromatography. The construction allows filtration to be carried out at high pressures, hence increasing rate of filtration. Contamination by heavy-metal ions is avoided by a design in which solutions are exposed only to lucite.

10483 How to Predict Calibration of Variable-Area Flow Meters. Kermit Fischer. *Chemical Engineering*, v. 59, June 1952, p. 180-184.

Describes predictable tubes and floats; derives calibration equations; and outlines method for sizing area flow meters and predicting their calibration. Diagrams, tables, and calibration curves.

10484 The Adsorption Method of Measuring Surface Areas. R. M. Barrer, N. Mackenzie, and D. MacLeod. *Journal of the Chemical Society*, May 1952, p. 1736-1744.

In order to investigate accuracy of the above, B.E.T.-type multilayer isotherms were derived, and examined by use of experimental sorption data obtained on montmorillonite and attapulgite. Results are charted, tabulated, and discussed.

10485 Safety and Industrial Hygiene in the Laboratory. Howard H. Fawcett. *Chemical and Engineering News*, v. 30, June 23, 1952, p. 2588-2591.

10486* Standardization of Micrographs of Atomized Jets. (French.) Frank Ferrie and Numa Manson. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 234, June 4, 1952, p. 2254-2256.

Proposes method of standardization by which the real volume of a jet, the number of drops in this volume, and their diameter can be ascertained. Describes experimental arrangement. Results are charted and discussed.

10487 Remote-Control Automatic Weighing. Enrico Klein. *Electronics*, v. 25, July 1952, p. 98-99.

Describes the Richardson Scale Co., Clifton, N. J., "Select-O-Weigh". Industrial control circuits applied to automatic weighing facilitate remote batching of process ingredients. Desired weights set up on a vernier dial are automatically obtained in proper sequence from storage bins by servomechanism. Circuit and other diagrams.

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10488* Tabular Methods for Critical-Speed Calculations. A. J. Morton. *Engineering*, v. 173, May 30, 1952, p. 674-675; June 6, 1952, p. 704-707.

Gives details of calculations for the above, applied particularly to the whirling of rotors and non-uniform shafts. Tables and diagrams.

10489 A Mechanized Computing Laboratory. Jack Belzer. *Engineering Experiment Station News* (Ohio State University), v. 24, June 1952, p. 3-4, 30-31.

Describes laboratory at O. S. U. which uses IBM punched-card equipment as an aid in computation of thermodynamic properties. Also discusses other problems for which applicable and the need for a centralized computing laboratory with an all-purpose electronic computer.

10490 Crystal Structure Calculations: An Example of the Programming of Structure Factor Calculations for a Computing Laboratory. Richard E. Gluyas. *Engineering Experiment Station News* (Ohio State University), v. 24, June 1952, p. 10-11.

10491 Calculation of Thermodynamic Properties and Intermolecular Force Constants of Imperfect Gases by Means of High-Speed Computers. David White. *Engineering Experiment Station News* (Ohio State University), v. 24, June 1952, p. 12-15, 32-33.

10492 Computation of Thermodynamic Properties of Gases From Spectra With the Aid of Punched Card Equipment. Jack Belzer, Lydia Savedoff, and Herrick L. Johnston. *Engineering Experiment Station News* (Ohio State University), v. 24, June 1952, p. 16-17, 33-35.

10493 Calculation of Pore-Size Distribution From Gas-Adsorption Data. J. C. Bell, Jack Belzer, and J. N. Pattison. *Engineering Experiment Station News* (Ohio State University), v. 24, June 1952, p. 18-19, 35-36.

Describes a method which greatly reduces the labor involved in the calculations. The model is essentially the same as that of Barrett, Joyner, and Halenda.

10494* Leak Detection With Radioactive Tracers and Halogen Gases in Gas Compression Cables and Pipes. N. Klein. *Engineers' Digest*, v. 13, June 1952, p. 176-180.

Discusses O'Duffy's gas-bubble leak-detection method and gives details of new methods of greater convenience and applicability.

10495* Vibration Pick-up With Large Frequency Range. Y. I. Yorish. *Engineers' Digest*, v. 13, June 1952, p. 185-186. (Translated and condensed from *Elektrichestvo*, Sept. 1951, p. 54-77.)

A seismic vibration pick-up is described, in which a permanent magnet is suspended as a seismic mass on bimetallic leaf springs with a helical spring support for gravity. Measurements of frequency and amplitude characteristics and temperature sensitivity are given. Diagrams and graphs.

10495a* Electrical Rotating Viscosimeter for Automatic Measuring, Recording, and Regulation of the Viscosity of Liquid Products. (German.) Adam Wesp. *Erdöl und Kohle*, v. 5, May 1952, p. 296-299.

Describes and diagrams the above.

10496 Modern Computing Machines. G. Truman Hunter. *Journal of the Franklin Institute*, v. 253, June 1952, p. 567-583.

A discussion principally of digital computing machines.

10497* Industrial Measurement of Elevated Temperatures in Molten Metals, Salts, and Slags. (German.) H. v. Zeppelin. *Giesserei*, v. 39, June 12, 1952, p. 287-289.

Describes difficulties encountered in the above. Relative merits of various methods and apparatus are discussed, especially various protective casings, such as quartz, Ni, and water-cooled types. Diagrams.

10498* Combination of X-Ray Focussing Mirrors in an X-Ray Microscope. Y. T. Thathachari and G. N. Ramachandran. *Journal of the Indian Institute of Science*, v. 34, sec. A, Apr. 1952, p. 67-73.

Contains a theoretical study of combinations of sperical crystal reflectors which can give X-ray images similar to those in an optical microscope.

19499* Surface Finish. P. E. Dyachenko. *Industrial Diamond Review*, new ser., v. 12, June 1952, p. 111-114. (Reprinted from *Courrier de la Normalisation*, v. 16(87), 1949, p. 279-283.)

Survey of Russian apparatus and procedures for surface-finish measurements. Diagrams, graphs, and illustrations.

10500 Instrumentation. Ralph H. Munch. *Industrial and Engineering Chemistry*, v. 44, July 1952, p. 65A-66A, 68A.

Describes a bonded-wire-type strain gage which will measure simple pickups for pressure, load, and torque. Schematic diagrams.

10501 Principles of Automatic Control. R. E. Rogers, Jr. *Instruments*, v. 25, June 1952, p. 758-761.

The 4 basic controller responses—2-position, proportional-position, reset, and derivative actions—and their pneumatic circuits are illustrated and described.

10502 Bismuth Thermocouples. Alvin B. Kaufman. *Instruments*, v. 25, June 1952, p. 762, 802-803.

Discusses properties and applications of ductile Bi and Bi-alloy thermocouples, especially in the low-temperature range. Gives practical directions for preparation of junctions and for use.

10503 Practical Application of Servomechanism Techniques to a Process Control Problem. S. P. Higgins, Jr., and G. W. McKnight. *Instruments*, v. 25, June 1952, p. 777-784; *I.S.A. Journal*, v. 8, June 1952, p. 71-78.

A typical problem—namely, a flow system—is analyzed by servo techniques. Predictions of system behavior by this method are correlated with results obtained from actual system tests. Diagrams and graphs.

10504 A Receiver of High Effective Absorption for Penetrating Radiation. Rudolf Ferrichs. *Journal of Applied Physics*, v. 23, June 1952, p. 697-698.

Describes a sandwich-type construction using layers of thin Al foil covered with a thin layer of a phosphor. Discusses various applications.

10505 A Printing Recorder for Use in Conjunction With Scaling Units. A. R. Lang. *Journal of Scientific Instruments*, v. 29, June 1952, p. 176-178.

Prints on a 6 in. wide continuous paper roll the counts registered by the counter and neons of one or two scaling units, together with an angle, recorded as degrees and minutes. Photographs.

10506 An Objective Method for Measuring the Daylight Factor. W. Koch and D. Kaplan. *Journal of Scientific Instruments*, v. 29, June 1952, p. 179-180.

Daylight factors are measured by connecting two photocells in a bridge-circuit. Minimizes errors due to deviation from the cosine law; disparity between sensitivity of photocell and human eye; heating-up of photocell in sunlight; and improper leveling of photocell. Photograph, and wiring and apparatus diagrams.

10507 Demountable X-Ray Tube for Crystallography. T. B. Rymer and P. G. Hambling. *Journal of Scientific Instruments*, v. 29, June 1952, p. 192-194.

A medium-power, demountable, shockproof x-ray tube is described. Construction is simple; various parts fit together to form a very rigid unit easily dismantled and reassembled without disturbing the focus. Photograph and sectional drawing.

10508 The Simultaneous Measurement of the Magnitude and Dispersion With Wavelength of a Small Birefringence. J. E. H. Braybon and H. G. Jerrard. *Journal of Scientific Instruments*, v. 29, June 1952, p. 194-196.

Describes method in which a Babinet compensator and a spectrometer are used. Discusses theory and accuracy.

10509 A Torsion Balance for Weighing Evaporated Films. P. L. Clegg and A. W. Crook. *Journal of Scientific Instruments*, v. 29, June 1952, p. 201-203.

Illustrated description of above which works within a vacuum chamber. Used in thickness measurement of metal films.

10510 Designing Mechanical Computers. Part I. Functions Having Two Variables. Eugene W. Pike and Thomas R. Silverberg. *Machine Design*, v. 24, July 1952, p. 131-137.

Explains how it is possible to design practical mechanical computers for involved functions by mathematical methods. Arbitrary functions having as many as 5 independent variables may be represented within the degree of accuracy desired. Mechanism employing 2 single variable-function linkages feeding into a linkage multiplier were successfully tested. Also, mechanisms for sums-of-functions plus products-of-functions were built and tested. Tables give illustrative examples of various problems.

10511 Electric Servomechanisms in Design. Julius Y. Kaplan. *Machine Design*, v. 24, July 1952, p. 157-162, 217.

Discusses basic analysis of closed-loop electric servomechanisms for automatic control of machines. Numerous diagrams.

10512 Analog Computers. C. B. Crumb, Jr. *Machine Design*, v. 24, June 1952, p. 177-180, 242.

Describes machines for determining the behavior of physical systems by the technique of simulation. The technique uses "models" which behave, mathematically, like their physical counterparts. Sample computer problem is shown in chart form, together with the circuit hookup used to solve it.

10513 Gauges for Jet Propulsion Unit Turbine Blades. E. J. Pirner. *Machinery* (London), v. 81, July 3, 1952, p. 14-19.

Describes and diagrams gages built for Fairchild Engine Div., Fairchild Engine & Airplane Corp., by Daco Machine & Tool Co., Brooklyn, N. Y.

10513a Ultrasonic Inspection Checks Quality of Brazed Joints. H. Greenberg. *Materials & Methods*, v. 35, June 1952, p. 102-105.

Describes how good correlation between shear testing and ultrasonic inspection resulted in adoption of above non-destructive test method for brazed circuit-breaker contacts. Cupaloy (99.5% Cu+0.5% Cr) is brazed to 65% W+35% Ag. Correlation chart, oscillograms, and a table of advantages and disadvantages.

10514 Miniature Radiography. S. L. Fry. *Metal Industry*, v. 80, June 13, 1952, p. 479-480.

Describes above as a method of cutting costs of x-ray examination. A small-size photograph is taken of a fluorescent screen the same size as the specimen.

10515* Operation and Possibilities of Application of the Field Electron-Microscope in Metallurgy. (German.) M. Drechsler and E. W. Moller. *Metall*, v. 6, July 1952, p. 341-345.

Indicates the possibility of obtaining micrographs showing course of chemical reactions taking place in the upper monomolecular adsorption layer. Various examples of such application are described, such as investigations on self-diffusion processes, adsorption, reactions on metal surfaces, and diffusion of carbon. Diagrams and micrographs. 10 ref.

10516* Gas Permeability of Films. Arthur H. Landrock and Bernard E. Proctor. *Modern Packaging*, v. 25, June 1952, p. 131-135, 199-201.

Describes and diagrams new method permitting simultaneous measurement of O_2 and CO_2 transmission. Includes tabular and graphical data for a variety of sheet packaging materials. 18 ref.

10517 Pressure-Humidity Apparatus. Arnold Wexler and Raymond D. Daniels, Jr. *Journal of Research of the National Bureau of Standards*, v. 48, Apr. 1952, p. 269-274.

An apparatus for producing atmospheres of known relative humidity, based on the "two-pressure principle", is described. It has a working space (test chamber) of 1 cu. ft., in which the relative humidity may be varied and controlled from 10 to 98%, the temperature from −40 to +40°C., the air flow up to 150 liters per min., and the pressure from ½ to 2 atm.

10518 "Elastic" and "Plastic" Hardness of Hard Materials. P. Grodzinski. *Nature*, v. 169, May 31, 1952, p. 925-926.

Describes method for measuring above based on application of a thin evaporated Ag layer to the matrix surface. Materials tested include boron and silicon carbide, synthetic corundum, and diamond. Graph and table.

10519 Recovery of Electron Microscope Grids. G. Eaves. *Nature*, v. 169, June 7, 1952, p. 975-976.

Describes a method of cleaning electron-microscope grids by flaming.

10520* Remotely-Operated Impact Tester. W. Pate, E. Hutto, and E. Marguerat. *Nucleonics*, v. 10, June 1952, p. 60.

Lists operations involved in remote operation of an impact tester, and in handling radioactive test specimens through a 3-ft. wall.

10521* Automatic Tester for G-M Tubes. G. H. Streit and W. R. Kennedy. *Nucleonics*, v. 10, June 1952, p. 61-62.

Describes an instrument developed to automatically trace the curve of counting rate vs. potential for a variety of G-M tubes. Data can be obtained for the starting potential, threshold, plateau, and beginning of the continuous-discharge region.

10522 Ball-Mill Operations. *Paint Manufacture*, v. 22, June 1952, p. 218-219.

Notes on grinding techniques and tests of lining materials. Tables.

10523* Static Magnetic Memory and Switching Circuits. Jan A. Rajchman. *RCA Review*, v. 13, June 1952, p. 183-201.

Discusses storage and switching—the 2 main problems encountered in using a matrix memory in computing machines.

10524* A Double Tetrode Electrometer for Surface Potential Measurements. A. V. Few and B. A. Pethica. *Research*, v. 5, June 1952, p. 290-291.

For measuring potentials at the air-water interface.

10525 Circular Sweep Chronograph for Single Millisecond Time Intervals. Arthur Linz, Jr. *Review of Scientific Instruments*, v. 23, May 1952, p. 199-203.

A chronograph is described which measures single time intervals up to 1000 microsec. with an accuracy of ±10 millimicrosec. with possibility of extending the precision to ±1 millimicrosec. Circuit diagrams.

10526 A Proportional Counter for Neutron Flux Measurements in the Energy Range 0.1 to 1 Mev. T. H. R. Skyrme, P. R. Tunnicliffe, and A. G. Ward. *Review of Scientific Instruments*, v. 23, May 1952, p. 204-209.

Above counter, filled with H_2 or CH_4, was developed for the measurement of monoenergetic neutron fluxes, with accuracy to better than 5%.

10527 A Semi-Automatic Graphical Computer With Use in Spectroscopy. G. L. Weissler, A. W. Einarsson, and J. D. McClelland. *Review of Scientific Instruments*, v. 23, May 1952, p. 209-212.

Describes a device capable of transforming semi-automatically a microphotometer density vs. wavelength trace into an intensity trace. In addition, the logarithms or antilogarithms of a variable can be graphically computed. A detailed example illustrates its operation.

10528 The Low Temperature Characteristics of Carbon-Composition Thermometers. J. R. Clement and E. H. Quinnell. *Review of Scientific Instruments*, v. 23, May 1952, p. 213-216.

The above are discussed. A semiempirical equation relating resistance and temperature and having 3 adjustable constants is given. Temperature calculated by this equation are said to be very accurate.

10529 A Simple Device for Finding the RMS Value of Recorded Data. C. M. Crain and M. F. Hainey. *Review of Scientific Instruments*, v. 23, May 1952, p. 243-245.

Describes above device. Graphs and circuit diagrams.

10530 A Cell for High Temperature Electrochemical Studies of Molten Salts and Slags. M. T. Simnad, W. E. Den-

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nis, and G. Derge. *Review of Scientific Instruments*, v. 23, May 1952, p. 248-249.

Describes a cell designed to measure accurately conductivity, transference numbers, and ionic mobility of the above. Large diagram of cell.

10531 A Recording Device for Surface Temperature Measurements. Nobuji Sasaki and Akira Kamada. *Review of Scientific Instruments*, v. 23, June 1952, p. 261-263.

Describes and discusses the above. Treatment considers the device itself; the 2-point thermocouple; and the portable thermostat. Diagrams.

10532 A Miniature Crystallizing Unit. Dan McLachlan and Carl J. Christensen. *Review of Scientific Instruments*, v. 23, June 1952, p. 306.

Describes a crystallizer which requires only 100 cc. of solution, can be taken apart for cleaning, and which accepts additions of solid material or rejects solvent without stopping the operation.

10533* New Method for the Production of Images in Non-destructive Investigation of Surface Defects of Products. (German.) W. Stauffer and A. Keller. *Schweizer Archiv für angewandte Wissenschaft und Technik*, v. 18, May 1952, p. 137-148.

Describes the so-called lacquer-film method for the above. Possibilities of application, its importance, and practical execution are described. Macrographs.

10534* Electron Microscopy of Isolated Chromosomes. Quentin Van Winkle, Mary W. Renoll, Justine S. Garvey, and Albert F. Prebus. *Science*, v. 115, June 27, 1952, p. 711-712.

Organization of chromosomes isolated from turkey and chicken erythrocytes and from calf thymus by the methods of Mirsky and Ris were studied in the electron microscope, which was used in conjunction with certain chemical and enzyme treatments. Special emphasis was placed on use of an electron staining procedure for desoxyribose nuclei acid.

10535* A Note on the Influence of the Optical System of a Microphotometer on the Plate Calibration Curve. (English.) A. Strasheim. *Spectrochimica Acta*, v. 4, no. 6, 1952, p. 489-495.

Influence of the optical system of 4 microphotometers: Zeiss, Leeds and Northrup, A.R.L., and Optica Milano on the plate calibration curve of a photographic plate is described. Conclusions are summarized.

10536* Results Obtained by Ultrasonic Testing of Heavy Forgings Using the Impulse-Reflection Method. (German.) Rudolf Schinn and Ursula Wolff. *Stahl und Eisen*, v. 72, June 5, 1952, p. 695-701; dis., p. 701-702.

Described and illustrated. 12 ref.

10537 High Speed Photography; Steel Research Tool. R. A. Buchanan. *Steel*, v. 131, July 7, 1952, p. 90-91.

Reviews various applications, including blast-furnace combustion zones, openhearth tapping streams, piercing of seamless tubing, and oil and spray quenching. Recommended photographic technique is also considered.

10538* The Simultaneous Measurement of Oxygen and Carbon Dioxide Permeabilities of Packaging Materials. A. H. Landrock and B. E. Proctor. *Tappi*, v. 35, June 1952, p. 241-246.

A method for measuring the above based on Dalton's law of partial pressures, is described. The test sheet is mounted between two chambers, the lower containing N_2 and the upper swept with a mixture of O_2 and CO_2. Apparatus diagrams, graphs, and tables. 18 ref.

10539* The High-Contrast (Wide-Field) Electron Microscope Objective and Fiber Replicas. Frederick F. Morehead. *Textile Research Journal*, v. 22, June 1952, p. 379-384.

The high-contrast, low-magnification lens designed by Hillier for the electron microscope is shown to be excellent in the study of fiber replicas. Different types of replicating materials are compared and their advantages and disadvantages noted. Stereophotomicrographs.

10540* The Use of the Penning Gage. Experimental Results as Compared With the Ionization Gage. (French.) M. J. Vermande. *Vide*, v. 7, Mar. 1952, p. 1145-1150; disc., p. 1150-1152.

Variations of sensitivity as a function of various factors is indicated, also the dependence of these variations upon voltage and magnetic field. Diagrams and graphs.

10541* Thermocouple Micromanometer. Theoretical and Experimental Study. (French.) D. Degras. *Vide*, v. 7, Mar. 1952, p. 1153-1171.

Describes a micromanometer based upon the principle of thermal conductivity of gases at low pressure. Discusses theoretical basis of this procedure, parameters affecting the sensitivity, influence of room temperature, and of electric charge of the couple. Outlines factors affecting the aging of the couple, and effects of the nature of the gas. Tables, graphs, and 13 ref.

10542 X-Ray Helps Produce Better Wire By New Methods Which Analyze Crystal Structure of Base Metals. John Buhler. *Wire and Wire Products*, v. 27, June 1952, p. 570-573.

Describes use of x-ray diffraction for the above. Compares x-ray diffraction and spectrometry with x-ray fluorescence. Describes application in qualitative and quantitative work. Equipment illustrated.

10543* A Simple Method of Measuring Elastic Constants With the Aid of Ultrasonic Impulses. (German.) A. Lutsch. *Zeitschrift für angewandte Physik*, v. 4, May 1952, p. 166-168.

Described and illustrated method measures the time required for a sound impulse to pass back-and-forth through the specimen.

10544* Means of Stabilizing Photoelectric-Cell Compensators and for Reducing the Recording Lag of Supported Measuring Scanners. (German.) H. Krüger. *Zeitschrift für angewandte Physik*, v. 4, May 1952, p. 173-176.

Causes and remedies for above instability are mathematically and experimentally investigated and different circuits for reducing the recording lag are described. Diagrams and graphs.

10545* Principles of Spark Motion-Picture Photography. (German.) H. Schardin and E. Fünfer. *Zeitschrift für angewandte Physik*, v. 4, May 1952, p. 185-199.

Reviews literature on the phtographic recording of extremely fast processes with motion-picture cameras, the exposure time of which is controlled by electric sparks instead of mechanical devices. Diagrams, tables, and graphs. 53 ref.

10546* A Light-Profile Microscope for Surface Studies. (English.) S. Tolansky. *Zeitschrift für Electrochemie; Berichte der Bunsengesellschaft für physikalische Chemie*, v. 56, Apr. 1952, p. 263-267; disc., p. 267.

Describes a new microscope technique which permits rapid study of topography of metal and crystal surfaces. The technique is a development of the familiar Schmaltz light-cut method and gives profile magnifications of up to 2000x with resolution of the order of 0.25μ. The method gives topography over a complete area with a single photograph and is easy to use. It is recommended for use for structures which are too coarse for precision interferometry.

Miscellaneous Publications

10547 Report of Committee A-1 on Steel. American Society for Testing Materials, Preprint 2, 1952, 45 pages. (TA401 Am35)

Recommendations affecting standards and specifications. Mechanical testing of structural steel. Specifications for heavy-walled carbon and low-alloy steel castings for steam turbines; for 5%-Cr, 0.5%-Mo steel plates for boilers and pressure vessels; for alloy-steel bars for nitriding; for electric-fusion welded austenitic Cr-Ni alloy-steel pipe for high-temperature service; and for carbon and alloy-steel forgings for rings for reduction gears.

10548 Report of Committee B-2 on Non-Ferrous Metals and Alloys. American Society for Testing Materials, Preprint 9, 1952, 11 pages. (TA401 Am35p)

Proposed tentative specifications for iodide titanium, titanium strip, sheet, plate, bar, tube, rod, and wire, and titanium ingot.

10549 Report of Committee B-4 on Electrical Heating, Resistance, and Related Alloys. American Society for Testing Materials, Preprint 10, 1952, 38 pages. (TA401 Am35p)

Recommended revisions of specifications, standards, and test methods. Chemical analysis of electronic Ni. Tests for thermionic-emission properties of electron-tube materials, and for sag of tungsten wire. Specifications for high-resistivity, low-temperature-coefficient wire, and for round Cr-Cu wire for electronic devices.

10550 Report of Committee B-5 on Copper and Copper Alloys, Cast and Wrought. American Society for Testing Materials, Preprint 11, 1952, 18 pages. (TA401 Am35p)

General recommendations affecting standards and specifications. Proposed tentative specification for rectangular copper wire for general purposes and for Cu-base-alloy centrifugal castings.

10551 Report of Committee B-7 on Light Metals and Alloys, Cast and Wrought. American Society for Testing Materials, Preprint 13, 1952, 30 pages. (TA401 Am35p)

Recommendations affecting standards and specifications. Proposed tentative recommended practice for codification of light metals and alloys, cast and wrought, proposed tentative specifications for Al and Al-alloy pipe, tube, rod, bars, shapes, sheet, and plate for pressure-vessel applications, and for Al bars for electrical purposes.

10552 Report of Committee E-1 on Methods of Testing. American Society for Testing Materials, Preprint 50, 1952, 21 pages. (TA401 Am35p)

Recommended revisions in the above. Includes standard hardness conversion table for nickel and high-nickel alloys; relationship between diamond-pyramid hardness, Brinnell hardness, and Rockwell hardness; and proposed method for diamond-pyramid hardness of metallic materials.

10553 A General Analytic Solution for Mohr's Envelope. Glenn Balmer. American Society for Testing Materials, Preprint 108, 1952, 12 pages. (TA401 Am35p)

Parametric equations are derived for Mohr's envelope (theory of failure) in terms of the principal stresses as parameters. The equations are perfectly general and apply to a linear or a curvilinear envelope. An example is presented using a linear equation for soil analysis. Confidence limits are derived as a measure of reliability of the fitted line. Another example is given using a curvilinear relation for failure of concrete specimens.

10554 Prediction of Creep Curves From Stress-Strain Data. Yoh-Han Pao and Joseph Marin. American Society for Testing Materials, Preprint 141, 1952, 7 pages. (TA401 Am35p)

Develops a method for predicting tension creep-time relations for constant stresses from tensile stress-strain relations at various strain rates. The method was applied to test data obtained using plexiglas, and agreement between actual and predicted creep-time curves was found to be good.

10555 Report on ASTM Task Group for Determination of Elastic Constants. Walter Ramberg. American Society for Testing Materials, Preprint 158, 1952, 7 pages. (TA401 Am35p)

Task Group mission was "to survey the work done in determining the elastic constants of materials and to recommend suitable method for determination of elastic moduli." Results of questionnaire are charted, tabulated, and discussed. They show the need for better methods of determining elastic constants of metals at elevated temperatures and of non-metals at all temperatures below the softening temperature.

10556 Methods for Determining the Elastic Constants of Nonmetallic Materials. E. W. Kuenzi. American Society for Testing Materials, Preprint 160, 1952, 10 pages. (TA401 Am35p)

Test methods for determining elastic properties of wood, plywood, glass-fabric laminates, and a variety of sandwich-core materials. Procedures were developed over a period of years and are used extensively at Forest Products Laboratory. Alternative methods and their disadvantages are discussed briefly. 11 ref.

10557 Report on the Principles Involved in the Determination of Absolute Viscosity. W. H. Markwood, Jr., editor. *American Society for Testing Materials, Proceedings*, v. 51, 1951, p. 441-474. (TA401 Am35p)

The report is not to be considered a laboratory manual, rather an introduction to rheology from a practical, schematic, and phenomenological point of view while resting on a sound theoretical base. Graphs, diagrams, and illustrations. 74 ref.

10558 Method of Measuring Interphase Tension at High Temperatures. S. I. Popel, O. A. Esin, and P. V. Gel'd. Henry Brutcher, Translation 2769, 8 pages. (From *Doklady Akademii Nauk SSSR*, new ser., v. 74, Feb. 21, 1950, p. 1097-1100.)

Discusses usefulness of numerical data on interphase tension for clarification of structural characteristics of liquid metals and slags, and for better understanding of certain processes occurring during the casting, crystallization, and welding of iron and steel. Describes development of method for measuring interphase tension with the aid of radiographs of liquid drops. Gives particulars of apparatus used and of procedure and a formula for calculation of surface tension on basis of observed drop sizes. Accuracy of results for Hg-air, Cu-gas, and Fe-gas systems as compared with those obtainable by other methods is discussed.

10559 Inspection of Electroplated Aircraft Parts. P. Skeggs. *Journal of the Electrodepositors' Technical Society*, v. 28, 1952, p. 15-26. (Preprint.) (TS670 El25j)

The general inspectional requirements of D.T.D. specifications covering plating of aircraft parts are outlined. Sampling and methods of testing are dealt with generally; the particular requirements of certain specifications are dealt with in more detail. Surface treatment of Zn and Cd coatings is discussed.

10560 Abrasion Hardness. T. A. Jaggar. Hawaiian Volcano Research Assn., Honolulu, T. H., 1950. 43 pages. (TN936 J18a)

After reviewing the work of sclerometry it is shown that yielding and relative softness are the mechanical basis of what should be called malacometry. Experiments were made with diamond drills, ring cuts, end millers, and grinding wheels. A scratch-hradness tester is described, and test data on wood, minerals, and steel are given. Abradability is discussed.

10561 Radiological Monitoring Methods and Instruments. National Bureau of Standards, Handbook 51, Apr. 7, 1952, 32 pages. (T21 Un3n)

10562 Development of NRL Photoelectric Particle-Size Meters (Owls). Wendell L. Anderson and Joseph K. Thompson. Naval Research Laboratory, Report 3808, May 28, 1951, 17 pages. (TK21 Un3rn)

Two photoelectric meters are described which will measure the particle size of mono-dispersed aerosols over the range of 0.2-0.4μ in diam. The meters give reproducible results and are sensitive to 0.0004μ. The M-2 meter is designed for routine measurement of particle size; the M-3 is a more versatile instrument designed for studies of the light-scattering properties of aerosols.

Books

10563 Industrial High Vacuum. J. R. Davy. 243 pages. 1951. Sir Isaac Pitman & Sons, Ltd., London. (QC166 D31i)

A comprehensive survey of the subject. Deals with design and manipulation of vacuum installations and gives sufficient basic theory for understanding of the principles involved. Chapters are included on application to major uses, method of handling, and control of the products. Chapters of special metallurgical interest are: Evaporation Technique for Thin Films; Deposition of Metals; Detailed Treatment of Some Metals; Semi-Transparent Films; Further Applications and Properties of Thin Films; and Vacuum Metallurgy.

10564 Review of Electronic Digital Computers; Joint AIEE-IRE Computer Conference. 114 pages. Feb. 1952. American Institute of Electrical Engineers, New York. (QA75 J66r)

Papers and discussions presented at AIEE-IRE Computer Conference, Philadelphia, Dec. 10-12, 1951. Descriptions of 10 large-scale electronic computers of varying design and performance were presented, giving a cross-section of the varying designs to date of both parallel and serial types of electronic computers using storage devices including mercury delay lines, magnetic drugs, and cathode-ray tubes. Other papers discussed

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detailed operating and component experience on certain of these calculators, and the final session summarized the present state of computer development and indicated some future possibilities of the transistor in computer design.

Book

10565 Proceedings of the London Conference on Optical Instruments, 1950. 264 pages. 1952. John Wiley & Sons, New York. (QC371 C76p)

21 papers and accompanying discussion, classified in the following groups: Photographic and Projection Lenses, Reflecting Microscopes, Gratings and Grating Instruments, Phase-Contrast Microscopes, Spectrophotometers, Reflecting Telescopes, New Optical Materials, and Miscellaneous.

See also:

9938a (inspection of steel forgings)
9977 (specifications for Al die castings)
10105 (microscopic examination of identical areas)
10185 (radioisotopes in metallurgical research)
10335 (camera for studying interior of pipes)
10401 (adaptation of photomultiplier photometer to spectrophotometer)
10598 (determining temperature of rapid transient phenomena)
10642 (measurements on thermal insulating materials)
10795 (quality control in design)
11362 (lead sulfide photocells)
11364 (sensitivity limits of photometers)
11395 (uses of radiation and radioisotopes)
11398 (magnetic amplifiers in industrial control devices)
11399 (molecular resonance in microwave-frequency stabilization)
11402a (servomechanism design)
11421 (devices using image-converter tubes)
11446 (beta-ray spectroscopy)
11453 (electrical noise from instrument cables)
11533 (geophysical-exploration techniques)

17. METALS—FABRICATION AND USES

10566* Corrugated Aluminum Sheets for Roofing. (Italian.) *Alluminio*, v. 21, May 1952, p. 179-199.

Discusses advantages in the use of Al for above, such as light weight and corrosion resistance. Graphs and diagrams show details of construction and mechanical properties. Installation process is described.

10567 High-Temperature Alloys in Relation to Gas-Turbine Design. K. L. Buckle. *Institution of Mechanical Engineers, Proceedings*, sec. A, v. 166, no. 1, 1952, p. 123-130.

Discussion is limited to the combustion and expansion sections of the gas turbine. Indicates that the use of metals in high temperature and stress conditions necessitates a new design approach. Significant mechanical properties of different high-temperature alloys, as well as ceramics, are thoroughly discussed. Examples of fatigue and creep failure are illustrated. Concludes with a discussion of fabrication characteristics and problems. Data are charted.

10568 Conservation of and/or Substitution for Critical Jet Engine Materials. N. E. Promisel. *Journal of Metals*, v. 4, July 1952, p. 698-702.

A list of major factors to be considered in determining the classification of a material as critical are given. Also included in the discussion are: critical jet-engine materials; conservation; new basic materials; and other conservation approaches.

10569 Factors in Selecting Stainless Steels to Reduce Costs, Improve Performance, and Conserve Critical Alloying Elments. Basil T. Lanphier. *Machine Design*, v. 24, July 1952, p. 112-128.

Outlines and compares in detail the distinguishing properties of many stainless steels as an aid to their evaluation for specific applications. Numerous tables of properties are given together with valuable graphs. Photographs illustrate applications of various types.

10570 Use of Needle Tubing Extended to Mechanical Applications. *Materials & Methods*, v. 35, June 1952, p. 106-108.

Describes mechanical properties of Type 304 stainless-steel hypodermic needle tubing and presents a summary of new uses, both surgical and mechanical.

10571* Corrosion-Resistant Steels and Their Application as Liner Material in the Chemical Industry, and in the Petroleum Industry in Particular. (English.) J. H. Van Swaal. *Metalen*, v. 7, Apr. 30, 1952, p. 137-143; May 31, 1952, p. 173-177.

Discusses relative merits of different types of the above. Transformations, phase relationships, welding effects, heat treatment, embrittlement, and other properties are discussed. 2nd part describes manufacture of clad steel by casting, fusion, arc welding, spot welding, etc. Macrographs, diagrams, tables, and graphs.

10572* The Current Status of the Aluminum Auto Radiator. J. R. Holmes. *Modern Metals*, v. 8, June 1952, p. 33-34.

Discusses the major technical problems being encountered in the development of the Al radiator at Harrison Radiator Div., General Motors Corp. These include high cost, welding and brazing difficulties, and others.

10573* The Use of Aluminum Transmission Lines in Switzerland. R. Voegeli. *Modern Metals*, v. 8, June 1952, p. 36, 38.

Examples of use of Al conductors are cited. Design considerations are also given. Economic advantages of Al conductors for various voltages up to 380 kv. are explained.

10574 Aluminum Brazing Sheet Used in Radiator Studies. *Steel*, v. 131, July 7, 1952, p. 96-97.

Discusses new Al-alloy brazing sheet developed by Alcoa which is expected to find immediate use in automotive radiator development. 3S alloy core has brazing alloy on one side, Alclad on the other. Diagrams and illustrations.

10575* Cable Lead. (German.) H. Boesche. *Zeitschrift für Erzbergbau und Metallhüttenwesen*, v. 5, June 1952, p. 217-219.

Discusses briefly damage to cables as the result of excessive oxidation, intercrystalline fractures, and coarse-grain formation; and indicates the necessity of standardizing lead alloys used in cables. Graphs.

Miscellaneous Publications

10576 Metal Powders in Some Small Arms Ammunition Applications. C. A. Miller, Jr. *Metal Powder Association*, "Proceedings, Seventh Annual Meeting", 1951, p. 30-38; disc., p. 38-40. (TN695 M56p)

Discusses experiments on use of powdered Fe in various projectiles, including small-calibre bullets, shells, armor-piercing cores, fuze parts, etc. Diagrams and illustrations.

10577 Metal Powder Applications in the Home Appliance Field. J. D. Carey. *Metal Powder Association*, "Proceedings, Seventh Annual Meeting", 1951, p. 68-76; disc., p. 76-77. (TN695 M56p)

An illustrated survey, with emphasis on G. E. appliances.

See also:

9943 (electrolytic Mn for welding rods)
10021 (prealloyed stainless-steel powders)
10067 (Al contacts in electropolishing)
10185 (liquid metals for heat exchangers)
10205 (new structural alloy steel)
10318 (Al and alloys for wire containers)
10322 (applications for Hastelloy C)
10792 (self-locking nut for high-temperature use)
11095 (replacing of metals by plastics)
11478 (Fe powder compacts in transformer cores)

18. POLLUTION AND WASTES

10578* A Rational Approach to Air-Pollution Legislation. George E. Best. *A.M.A. Archives of Industrial Hygiene and Occupational Medicine*, v. 5, June 1952, p. 517-526.

In reference to above, presents principles of legislation developed to create the framework within which a proper bill can be written if it is determined that a control law is wanted.

10579* Organization and Operation of a Study of Air Pollution in Relation to Experimental Carcinogenesis. Paul

Kotin. *A.M.A. Archives of Industrial Hygiene and Occupational Medicine*, v. 5, June 1952, p. 548-553.

Includes a description of apparatus for collecting smog samples so that particulate and gaseous phases can be obtained both simultaneously and independently. Apparatus drawing and photographs. 16 ref.

10580 Evaluation of Particulate Concentrations With Collecting Apparatus. Stanley R. Hall. *Analytical Chemistry*, v. 24, June 1952, p. 996-1000.

Describes auotmatic sampler, and a reflectance procedure for obtaining large quantities of information for evaluating air-pollution levels. Discusses limitations and advantages of a proposed scale of values for particulate levels. Graphs, tables, and photographs. 13 ref.

10581* The Safe Disposal of Contaminated Extract Air from Radioactive Laboratories. J. W. J. Fay. *Atomics* (London), v. 3, June 1952, p. 143-148.

Discusses recommended procedures in considerable detail.

10582* Dust—and What Welbilt Stove Company Did About It. *Better Enameling*, v. 23, July 1952, p. 8-13.

Tells how the Welbilt Stove Co., Inc., Maspeth, Long Island, N. Y., instituted a program to get rid of the dust in their enameling work and reduce costs at the same time.

10583 Dissolved Air Goes to Work. *Chemical Engineering*, v. 59, June 1952, p. 270, 272.

Describes and lists current industrial usage of the Colloidair process of Bulkley, Dunton Processes, Inc., N. Y. Bubbles formed upon release of air dissolved under pressure float suspended solids in waste. Supplemental action may be had by use of floc-forming chemicals.

10584 Use of Ultrasonic Coagulator With a Cyclone Separator. J. R. Krebs and R. C. Binder. *Combustion*, v. 23, June 1952, p. 45-47.

Results of preliminary investigations at Purdue to determine effectiveness of high-frequency, steam-jet-induced vibrations in coagulating particles of dust and smoke. The device is attached to the breeching of the power-plant stack.

10585* New Combustion Catalyst Beats Air Pollution. Arthur E. Uhleen. *Factory Management & Maintenance*, v. 110, July 1952, p. 124-125.

Houdry catalyst unit consists of a brick plus 73 porcelain rods coated with catalytic alumina and platinum alloy. This coating completely oxidizes combustibles even at temperatures well below their normal burning points and generates enough waste heat to fire boilers and heat plant processes. Arthur E. Uhleen describes highly satisfactory experiences of Enamelstrip Corp., Allentown, Pa., in using the catalyst units in the paint-drying ovens.

10586 Symposium on Air Pollution. *Industrial and Engineering Chemistry*, v. 44, June 1952, p. 1339-1388.

Presented in part at the XIIth International Congress of Pure and Applied Chemistry, New York, Sept. 1951. 9 papers on various aspects. 20 ref.

10587 Industrial Wastes. Harold R. Murdock. *Industrial and Engineering Chemistry*, v. 44, July 1952, p. 83A-84A, 86A.

Describes the operation and work of the Southern Association of Science and Industry, Inc., which was organized to promote the study and development of the resources of the South. Discusses their regional plan for abatement of stream pollution.

10588 Atmospheric Pollution. *Industrial and Engineering Chemistry*, v. 44, July 1952, p. 89A-90A, 92A.

Short resumé of 14 papers presented at Second National Air Pollution Symposium, Pasadena, Calif., May 5-6, 1952. Discussions were categorized as follows: Status Reports; Our Knowledge of Atmospheric Pollutants; Fundamental Chemistry and Physics of the Atmosphere; Combustion as a Contributor to Air Pollution; and Biological Aspects of Air Pollution.

10589 Atmospheric Pollution. Louis C. McCabe. *Industrial and Engineering Chemistry*, v. 44, June 1952, p. 103A-104A, 106A.

Tests indicate that 2 or more types of equipment may be required to control gases from gray-iron foundries as no single, inexpensive, dust-recovery principle seems adequate.

10590* Treating Industrial Wastes at National Carbon. C. F. Pearson. *Industry and Power*, v. 62, June 1952, p. 78-80.

Procedures and equipment for disposal of plating and pickling wastes at National Carbon's St. Albans, Vt., plant.

10591* A Method for Estimating Low Levels of Radioactive Contaminants in Water. A. H. Emmons and R. A. Lauderdale. *Nucleonics*, v. 10, June 1952, p. 22-23.

Describes new column-type water monitor which combines advantages of measuring low concentrations of activity with adaptability for continuous operation. Graphs.

10592* Scrubbing Devices for Air Pollution Control. E. P. Kropp and R. N. Simonsen. *Paint, Oil & Chemical Review*, v. 115, July 3, 1952, p. 11, 14, 16.

Deals with air pollution from refinery operations, discussing major sources of pollution and describing control measures especially by use of a fog filter. Diagrams and tables.

10593 Smog—Its Status Today. Frank Breese. *Petroleum Processing*, v. 7, June 1952, p. 801-805.

Discusses causes of smog in Los Angeles on the basis of extensive research for past 5½ yrs. How much is caused by the oil industry and how much by other sources are discussed. What has been done and what can be done are considered.

10594 Coal Removes Phenols from Wastes. G. Gutzeit. *Petroleum Processing*, v. 7, June 1952, p. 828-832.

New adsorption treatment developed by General American Transportation can handle wastes carrying up to 500 ppm. of phenolic compounds. Flow diagram and illustrations show prototype plant at Saegertown, Pa. Economic factors are evaluated.

10595* Bench-Scale Biological Oxidation of Refinery Wastes with Activated Sludge. R. H. Cole. *Sewage and Industrial Wastes*, v. 24, June 1952, p. 731-749.

A study was undertaken to determine the feasibility of treatment of petroleum-refinery effluent by the above process. A bench-scale unit was devised for this study which permitted continuous feeding of waste water and continuous removal of treated product. Apparatus is illustrated. Diagrams, graphs, and tables.

10596* Chemical Oxidation of Phenolic Wastes with Chlorine. N. S. Chamberlin and A. E. Griffin. *Sewage and Industrial Wastes*, v. 24, June 1952, p. 750-760; disc., p. 761-763.

Thorough coverage of laboratory and pilot-plant work in connection with oxidation of phenols in chlorine. Results summarized.

See also:
9935 (recovery and utilization of waste SO_2)
10468 (detection and measurement of aerosol particles)
10626 (boiler units in relation to air pollution)
11197 (effect of planktons on liquid wastes)

19. FUEL TECHNOLOGY

10597 The Theory of Three Limits of Spontaneous Combustion. (Russian.) N. S. Akulov. *Doklady Akademii Nauk SSSR*, new ser., v. 83, Mar. 21, 1952, p. 427-430.

A theoretical, mathematical analysis. 12 ref.

10598* Line-Reversal Techniques in the Determination of Temperature of Gun Flash or Other Rapid Transient Phenomena. J. T. Agnew. *Transactions of the American Society of Mechanical Engineers*, v. 74, Apr. 1952, p. 333-340; disc., p. 340-342.

Describes modification of the conventional line-reversal technique for determination of temperature of an exploding gas mixture. A general discussion of the significance of temperature of gaseous explosions is also presented. It is believed that the techniques presented should be useful in combustion research.

10599 Pitt Consol's Experimental Unit Promises to Convert Coal to Electricity in One Step. *Business Week*, June 28, 1952, p. 74, 76.

Outlines electrolytic process which is seen as possible successor

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to present method for producing electricity from coal via the steam turbine. Pittsburgh Consolidation Coal is beginning construction of an experimental unit in which carbon is heated in contact with steam to produce gas. This gas is fed into a fuel cell where it produces electricity directly, by a method similar to the process that takes place in a storage battery. As the gas takes oxygen from one electrode, other oxygen to replace it is absorbed from air passing the other electrode. Pitt Consol expects 80% of the fuel's energy to emerge from the unit as electricity; steam plants now yield only 35%.

10600* The Problem of Gas Formation Gas Producers. (German.) Franz Sabel. *Chemie-Ingenieur-Technik*, v. 24, June 1952, p. 339-347.

Discusses several types of gas producers, giving examples from practice to show the effects of different factors on composition of gas produced at near atmospheric pressure. 16 ref.

10601* Elementary Processes in the Combustion and Gasification of Coal. (German.) H. Behrens. *Chemie-Ingenieur-Technik*, v. 24, June 1952, p. 349-352.

On the basis of recent experiments by British and Russian investigators, and the author's studies on reaction kinetics, probable elementary reactions of the 3 stages of combustion are discussed. Processes involved in coal gasification and questions of solid-gas energy distribution are also discussed. 14 ref.

10602* Dilatometer With Mechanical Recording for Physicothermal Study of Coals. (French.) Eugene Joumier and Lucien Millereux. *Comptes Rendus hebdomadaires de Séances de l'Académie des Sciences*, v. 234, June 4, 1952, p. 2277-2279.

Describes and diagrams above apparatus. Typical results are charted and discussed.

10603* Testing the Burning of Low-Grade Coals in Burners With Baffles. (Russian.) V. K. Dmitriev. *Za Ekonomiiu Topliva*, v. 9, Apr. 1952, p. 8-11.

A series of tests was made on the use of low-grade coals from the Central Asiatic Basin in power plants using special combustion chambers. Data are tabulated.

10604* The Problem of Pulsations in Boiler Fireboxes When Burning Gas. (Russian.) A. K. Lyskii. *Za Ekonomiiu Topliva*, v. 9, Apr. 1952, p. 12-13.

Tests proved that pulsations are caused by nonuniform mixing of gas and air. Turbulent burners reduced fuel consumption by 10-15%.

10605* Practical Standardization of Fuel Consumption for Industrial Furnaces. (Russian.) L. N. Muromskii. *Za Ekonomiiu Topliva*, v. 9, Apr. 1952, p. 16-22.

Discusses development of equations for evaluating the above. Data are charted.

10606 Evaluation of Flame Speed at Burner Flame Tip. L. C. Lichty. *Industrial and Engineering Chemistry*, v. 44, June 1952, p. 1395-1398.

The high flame velocities reported at the Bunsen-burner flame tip are usually assumed to be the result of large heat-transfer effects to the central burner stream. Both the high flame velocities and the large heat-transfer effects are questioned. Experimental data on mixture velocity before, and products velocity after, the flame are reconciled by assumption of a ram effect, which decreases mixture velocity before entering the flame and provides part if not all of the pressure rise required for the momentum effect of flow through the flame. Flame temperatures determined at various positions and thermodynamic analysis indicate that only small heat-transfer effects are present and that the central-mixture flame velocity is much lower than has been reported.

10607 Flame Propagation Studies Using the Hydrogen-Bromine Reaction. Stone D. Cooley and Robbin C. Anderson. *Industrial and Engineering Chemistry*, v. 44, June 1952, p. 1402-1406.

Experimental studies of properties of flames in H_2-Br mixtures are being made as a basis for testing various concepts of flame propagation. Data have been obtained on burning velocities in mixtures of different composition and at different temperatures. 18 ref.

10608 Gasification of Fuels. Flame-Stability Limits of CH_4, H_2, and CO Mixtures. Joseph Grumer and Margaret E. Harris. **Interchangeability of Oil Gases or Propane-Air Fuels With Natural Gases.** Joseph Grumer, Margaret E. Harris, and Harold Schultz. **Combustion of Carbon in High Temperature, High Velocity Air Streams.** J. M. Kuchta, A. Kant, and G. H. Damon. **Kinetics of Steam-Carbon Reaction in Porous Graphite Tubes.** H. J. Johnstone, C. Y. Chen, and Donald S. Scott. **H_2-CO Reaction in a Tubular Reactor With Fe-Cu Catalyst.** W. M. Campbell and H. F. Johnstone. *Industrial and Engineering Chemistry*, v. 44, July 1952, p. 1547-1575.

Papers from the Symposia on Theoretical Aspects of Combustion and Gasification and Flame Studies on Interchangeability of Fuel Gases presented before the Division of Gas and Fuel Chemistry and Physical and Inorganic Chemistry at the Diamond Jubilee Meeting of the American Chemical Society. Numerous graphs and tables. 63 ref.

10609 Shale Oil in Sweden. *Industrial and Engineering Chemistry*, v. 44, July 1952, p. 15A, 17A.

Economical status and production methods are discussed.

10610* The Time Required for Constant-Volume Combustion. A. S. Campbell. *Journal of Applied Mechanics*, v. 19 (*Transactions of the American Society of Mechanical Engineers*, v. 74), Mar. 1952, p. 72-76.

Employs results of analytical study of the progressive burning process to derive a relation between the so-called "normal burning velocity" and the time rate at which unburned gas is converted to burned gas. This relation is used to estimate total time for the entire burning process.

10611 A Mechanical Theory of Spinning Detonation. James A. Fay. *Journal of Chemical Physics*, v. 20, June 1952, p. 942-950.

Spinning detonation is treated principally from a hydrodynamic viewpoint by considering a possible periodic fluid motion with a characteristic frequency. In spinning detonation, flame photographs on a moving film show an undulating wave front and noticeable striations in the wake of the detonation, unlike the uniform propagation of most detonation waves. Graphs and photographs.

10612 Polyhedral Flames With Hydrogen and Hydrocarbons. Herbert Broida and Walter Kane. *Journal of Chemical Physics*, v. 20, June 1952, p. 1042-1043.

Brief discussion of the effects of diluents upon temperature and flame speeds of premixed combustible mixtures.

10613 Nonisotropic Propagation of Combustion Waves. George H. Markstein. *Journal of Chemical Physics*, v. 20, June 1952, p. 1051-1052.

Brief discussion of the above.

10614* A Study of the Reactions of Carbon Monoxide With Coke. Arnold E. Reif. *Journal of Physical Chemistry*, v. 56, June 1952, p. 778-784.

The reaction between CO and a degassed high temperature coke was investigated between 700 and 1000°C. and in the pressure range 1-63 cm. Numerous graphs. 14 ref.

10615* The Mechanism of the Carbon Dioxide-Carbon Reaction. Arnold E. Reif. *Journal of Physical Chemistry*, v. 56, June 1952, p. 785-788.

Experimental evidence is presented to show the reaction of CO_2 with a high-temperature coke at 900°C. and under approximately atmospheric pressure. Tables. 14 ref.

10616* The Industrial Testing of the Reactivity of Coke. (German.) S. Traustel. *Metall*, v. 6, June 1952, p. 298-302.

Describes various industrially used methods for testing of the reactivity of combustibles. The advantages of absolute and relative methods are indicated; possibilities for improving the latter are proposed.

10617* Longitudinal Vibrations of Flames in Long, Sealed Combustion Bombs. (German.) U. Neubert. *Zeitschrift für angewandte Physik*, v. 4, Apr. 1952, p. 121-126.

High-speed motion pictures recorded the schlieren configura-

tion of the advancing flame front and showed that each vibration is accompanied by reversal of flow direction. An explanation of the nature of the vibrations is advanced. Diagrams and photographs. 12 ref.

10618* The Effect of Intense Sound Waves on Propagation of Gas Flames in Tubes. (German.) L. Ehret, U. Neubert, and H. Hahnemann. *Zeitschrift für angewandte Physik*, v. 4, Apr. 1952, p. 126-134.

Above are shown to decelerate the rate of propagation of flames and even extinguish them. Diagrams, schlieren photographs, tables, and graphs. 10 ref.

10619* Detonation-Wave Oscillography by Means of Corona Probe. (German.) H. Oertel. *Zeitschrift für angewandte Physik*, v. 4, May 1952, p. 177-183.

Describes fundamental principles and techniques for the above. Typical data charted. 13 ref.

10620* Primary Processes in the Combustion of Graphitic Carbons. (German.) E. Wicke. *Zeitschrift für Electrochemie; Berichte der Bunsengesellschaft für physikalische Chemie*, v. 56, Apr. 1952, p. 414-420.

Critically discusses experimental methods for establishing the primary reaction. Results of these methods are indicated and evaluated. Proposes a reaction mechanism for the process. Graphs and diagrams. 16 ref.

Miscellaneous Publications

10621 Pilot-Plant Batch Retorting of Colorado Oil Shale. W. E. Wells and J. R. Ruark. U. S. Bureau of Mines, Report of Investigations, 4874, May 1952, 19 pages. (TN21 Un3r)

Describes experimental investigations. Three heat-carrying mediums were used—hot shale gas, superheated steam, and hot flue gas. Equipment diagrammed; results tabulated, charted, and discussed.

Books

10622 Pyleprigotovlenie na Elektrostantsiiakh. (Coal Pulverization in Electric Power Sattions.) (Russian.) A. N. Lebedev. 352 pages. 1949. State Power Publishing House, Moscow and Leningrad, U.S.S.R. (TP328 L49p2)

Discusses the production of pulverized coal, its physical and technical characteristics and methods of sampling. Various methods of pulverization in different types of mills are described in detail. Work is based on laboratory research and on studies of equipment used in the thermoelectric stations of the USSR.

See also:

9916 (papers on coal sampling)
9921 (evaluation of blast-furnace coke)
9922 (coke-oven gas in the open hearth)
9960 (carbonizing conditions and coke properties)
10826 (liquefaction and gasification of coal)
11308 (theory of detonation in gases)

20. HEATING, DRYING, AND AIR CONDITIONING

10623* A Forced-Ventilation Tobacco Curing System. E. Martin Matthews and Vernon H. Baker. *Agricultural Engineering*, v. 33, July 1952, p. 429-430.

Described and diagrammed.

10624* Cross-Flow Heat Exchangers. Part I. A Summary of the General Theory Applicable to Coolers and Heaters. J. K. Reid. *Aircraft Engineering*, v. 24, June 1952, p. 173-176.

In addition to the theory summary, application of the theory is given to the design of the honeycomb type of cooler with special reference to air-to-air coolers used in air-conditioning systems. Diagrams. (To be continued.)

10625* Approximate Formulae in the Theory of Thermal Regenerators. B. H. Schultz. *Applied Scientific Research*, v. 3, sec. A, no. 3, 1952, p. 165-173.

Presents above for some limiting cases. The formulas are series expansions for the fluctuating temperatures and the efficiency in terms of reduced surface and reduced heat capacity.

10626 Spreader Stoker Fired Water Tube Boiler Units and Their Relation to Air Pollution. Earle C. Miller. *Blast Furnace and Steel Plant*, v. 40, July 1952, p. 806-809, 828.

Discusses above, considering: presale engineering; furnace and boiler design; preheated air; reinjection; ashpit construction and ash removal; combustion controls; forced and induced draft-fan selection, and instrumentation. Tables and diagrams.

10627 Turning Waste Heat Into Refrigeration. *Diesel Power and Diesel Transportation*, v. 30, June 1952, p. 66-68.

Describes a unit developed by Coblenz Equipment Co. for above purpose. Waste heat from Diesel engines is utilized by a H_2O-LiBr system. Flow and other diagrams and photograph.

10628* Testing Combined Muffle Burners. (Russian.) A. F. Boev and F. M. Muratyshev. *Za Ekonomiiu Topliva*, v. 9, Apr. 1952, p. 4-7.

Describes and discusses the use of combination burners for boilers so that both powdered coal and petroleum residue can be used. The oil is used to take care of load fluctuations and for ignition of the powdered coal. Considerable saving of oil is gained by this arrangement. Operating data are tabulated and charted.

10629* Possibilities of the Heat Pump in Canada. E. A. Allcut and F. C. Hooper. *Engineering Journal*, v. 35, June 1952, p. 610-614.

A study of the above in relation to 3 typical problems: space heating in an industrialized area; space heating in Arctic regions; and industrial application in mining operations. Graphs, flow diagram, and tables.

10630* Generator With Revolving Roll Grate and Automatic Slag Removal. (German.) Fritz Wurz. *Gas- und Wasserfach*, v. 93, May 15, 1952, p. 255-257.

Description and illustration of above includes tabulated experimental results.

10631* Heat Insulation of Industrial Furnaces. (German.) Ernst Maase. *Gas- und Wasserfach*, v. 93, June 1, 1952, p. 319-323.

Discusses the necessity of insulating gas furnaces in the same manner as electric furnaces. Proposes simple methods for deducting the heat losses through the walls, and factors for determining it from diagrams. Data are tabulated.

10632 Experimental Data on Drying Atmospheric Air for a Supersonic Wind Tunnel. W. E. Emley, Jr. *Heating, Piping & Air Conditioning*, v. 24, July 1952, p. 117-122.

At Lewis Flight Propulsion Laboratory of the NACA, Cleveland, Ohio, it was necessary to provide air dried to −40°F. dew point at a rate in excess of 1,500,000 cfm. for prolonged periods of time. Lack of published information necessitated a desiccant evaluation program on the performance of commercially available adsorbent materials. A pilot dryer was constructed and operated over a range of face velocities, bed depths, and inlet-air conditions simulating feasible design values for a large-scale adsorptive air dryer. Granular silica gel, pelletized silica gel, and activated bauxite were studied.

10633 A Smoke-Filament Technique for Experimental Research in Room Air Distribution. H. B. Nottage, J. G. Slaby, and W. P. Gojsza. *Heating, Piping & Air Conditioning*, v. 24, July 1952, p. 123-125.

Describes technique and apparatus. Presents typical data.

10634 Status of the Heat Pump in the Southeast. S. L. Pappas and F. R. O'Brien. *Heating, Piping & Air Conditioning*, v. 24, July 1952, p. 126-130.

Over 125 heat-pump installations in the Southeast were surveyed and data collected regarding design, initial cost, operating expenses, and maintenance. Tables and graphs.

10635* Operating Performance of a Heat Pump Water Heater. E. B. Penrod. *Heating and Ventilating*, v. 49, July 1952, p. 63-69.

The installation is described and diagrammed. Results of long- and short-duration tests are tabulated, charted, and discussed. Appendix gives details of calculations.

20. *Heating, Drying, and Air Conditioning*

10636* Theory vs. Practice in Radiant Heating. Part 4. T. Napier Adlam. *Heating and Ventilating*, v. 49, July 1952, p. 78-82.
A design procedure is presented for several floor and ceiling conditions. Graphs. (To be continued.)

10637* Control of Boilers Fired by Solid Fuels in Suspension. Llewellyn Young. *Institution of Mechanical Engineers, Proceedings*, sec. A, v. 166, no. 1, 1952, p. 91-102; disc., p. 103-111.

Discusses those characteristics of boiler design and performance which have favored the parallel development of automatic control of boiler auxiliaries. Theory of elementary forms of automatic control devices is dealt with simply, and the mechanism described. Examples are given of the use of standard apparatus. The more complicated installations of boilers fired by spreader stokers, pulverized fuel, and cyclone furnaces are also dealt with. Numerous schematic diagrams.

10638* The Forced Convection of Heat at Great Speeds and High Temperatures. (French.) E. Brun and M. Plan. *Journal des Recherches du Centre National de la Recherche Scientifique*, Mar. 1952, p. 97-112.

Describes the above. Discusses in particular the measurement of such convection, plotting curves of the measurements, and practical application of theoretical considerations. Data are tabulated and charted. 20 ref.

10639* Modern Design Principles in Pyro-Processing. Part II. Kiln Systems. Wolf G. Bauer. *Pit and Quarry*, v. 44, June 1952, p. 119-122.

Deals with the higher temperature phases and with kiln operation under normal, abnormal, and difficult conditions. Mainly applicable in the nonmetallic-mineral industries for calcining, sintering, agglomeration, nodulizing, roasting, and crystallization. (To be continued.)

10640* Factors in Control of Dust From Coal-Fired Boiler Furnace. Elmer R. Kaiser. *Plant*, v. 6, July 1952, p. 44-47.
Outlines some of the technical factors involved in the control of boiler dust and indicates problems in need of clarification. Describes formation of dust particles, explains effect of particle density and gas temperatures on terminal velocity of the particles, and suggests an interim method of determining their densities.

Miscellaneous Publications

10641 Laboratory Air Conditioning. A. E. Stacey, Jr. American Society for Testing Materials, Preprint 121, 1952, 6 pages. (TA401 Am35p)

Discusses air-conditioning equipment and requirements of control, research, and development laboratories.

Books

10642 Symposium on Thermal Insulating Materials. 57 pages. 1952. American Society for Testing Materials, Philadelphia. (Special Technical Publication 119.) (TH1715 Am35.1s)

Consists of introduction by Ray Thomas plus the following papers and accompanying discussions: "Basic Concepts of Water Vapor Migration and Their Application to Frame Walls", F. A. Joy; "Theory of, and Appropriate Methods for Measurement of Surface Emittance", L. P. Herrington; "Methods of Measurement and Application of the Theory of Specific Heat to Thermal Insulating Materials", Norman H. Spear; "Interlaboratory Comparison of Thermal Conductivity Determination With Guarded Hot Plates", Henry E. Robinson and Thomas W. Watson; and "Experiments With a Guarded Hot Plate Thermal Conductivity Set", C. F. Gilbo.

See also:
10864 (heat absorption rates in tubular heads)
11553 (experimental drying equipment)

21. PRIME MOVERS

10643 Improving Turbojet Service Life. Warren R. Petersen. *Aero Digest*, v. 64, June 1952, p. 50, 52, 54, 56-59.

Discusses metallurgical, operating, and design problems. Proposes logging system to compensate for the human error involved in turbojet operation and to efficiently utilize the most advantageous portion of design criteria and materials of construction.

10644* The Pressure-Jet Helicopter — Performance Data and Operating Experience. Igor B. Bensen. *Aeronautical Engineering Review*, v. 11, June 1952, p. 41-51.

Presents results of an extensive evaluation study conducted on a pressure-jet helicopter, with particular emphasis on the thermodynamics of its power cycle. Diagrams, graphs, and photographs.

10645 Bristol's New Proteus. *Aeroplane*, v. 82, June 6, 1952, p. 685-695.

Detailed illustrated description of latest version of above, a reverse-flow airscrew-turbine with a 12-stage axial plus one-stage centrifugal compressor, destined to power the production version of the Bristol 175 Britannia.

10646* Research for Guided Missiles. *Aeroplane*, v. 82, June 13, 1952, p. 725-727.

Describes and illustrates a piloted and a pilotless target aircraft produced in Australia as part of a guided-missile program.

10647* A Variable-Shape Aeroplane. *Aeroplane*, v. 82, June 20, 1952, p. 749-752.

The ideal shape of a plane for supersonic flight is quite different from that desirable for low-speed flight. Since all piloted aircraft must pass through the latter region during take-off and landing, considerable difficulties arise. Describes and diagrams patented British scheme for shape modification during flight. The wings are hinged to the fuselage to permit gradual shift from the "swept" to the "unswept" condition.

10648* Damage Prevention From Diesel Engine Crankcase Explosions. A. C. Cavileer. *Transactions of the American Society of Mechanical Engineers*, v. 74, Jan. 1952, p. 1-5; disc., p. 5-6.

The general problem is stated and test work being undertaken by the author's branch of the U. S. Navy is described. Results and recommendations for adequate pressure-relief arrangements are given.

10649* Diesel Engine Crankcase-Explosion Investigation. G. W. Ferguson. *Transactions of the American Society of Mechanical Engineers*, v. 74, Jan. 1952, p. 7-19; disc., p. 19-21.

Presents information gained from a study of lubricating-oil aspects of crankcase explosions. Experimental tests indicate that the crankcase atmosphere of a Diesel engine is a potentially inflammable mixture of oil mist and air in which ignition may be initiated by an overheated part. No significant differences were found in the minimum ignition temperature of a wide variety of lubricating oils, even when diluted with up to 20% diesel fuel. 11 ref.

10650* Nondimensional Compressor Performance for a Range of Mach Numbers and Molecular Weights. H. E. Sheets. *Transactions of the American Society of Mechanical Engineers*, v. 74, Jan. 1952, p. 93-101; disc., p. 101-102.

Performance of centrifugal compressors is analyzed on the basis of nondimensional pressure and impeller-exit flow coefficients. Use of these coefficients for impellers of high solidity permits presentation of compressor performance in a single curve for all conditions up to a critical Mach number. Test data for two compressors are presented over a range of Mach numbers from 0.36 to 2.0.

10651* Octanes and Knock in Petrol Engines. George E. Mapstone. *Australasian Institute of Mining and Metallurgy, Proceedings*, Mar.-June, 1951, p. 65-95.

A general discussion and literature review. 62 ref.

10652* 2½ Litre Lea-Francis Engine. *Automobile Engineer*, v. 42, June 1952, p. 203-210.

Gives details of above, a power unit for an 18 h.p. British car. Drawings, graph, and photographs.

10653* Turbo-Compressors. A. J. Penn. *Automobile Engineer*, v. 42, June 1952, p. 230-234.

Describes design and operation of exhaust-driven units for 4-stroke diesel engines, and discusses problems associated with

matching these units to the engines to obtain optimum performance. Diagrams, graphs, and photographs.

10654 Helicopter Powerplant Analysis. *Automotive Industries*, v. 106, June 15, 1952, p. 36-37, 116, 118, 122, 125-126.

Presents portions of the following papers read at the 8th Annual Forum of the American Helicopter Society: "Gas Turbines Versus Reciprocating Engines", Joseph Stuart, III; "Special Air Force Helicopter Projects", Wayne W. Eggert; and "Helicopters for the Short Haul", J. E. Rothman. Table and graph.

10655 Air Does Hairline Job in Turbine Drive. Scott H. Reiniger. *Aviation Week*, v. 56, June 23, 1952, p. 64, 67-68.

Describes details of air turbine drives of Stratos Div., Fairchild Engine and Airplane Corp. They are claimed to have high-accuracy performance despite large fluctuations in air supply.

10656 Redesigned Proteus Has Better Economy. David A. Anderton. *Aviation Week*, v. 57, July 14, 1952, p. 22-23, 25, 29-30.

Tests runs of Model III of Bristol's turboprop engine show better thrust and fuel consumption than estimate, despite reductions in weight and length. Illustrated.

10657* Gas Turbines. Part 3. I. G. Bowen. *Coke and Gas*, v. 14, June 1952, p. 201-207.

Describes a range of existing and projected designs, illustrating important mechanical and economic features. Schematic diagrams and graphs.

10658* Operating Characteristics of Steam-Jet Compressors. (Russian.) N. M. Zinger. *Za Ekonomiiu Topliva*, v. 9, Apr. 1952, p. 22-27.

Calculations and graphs.

10659* Maintenance and Operating Experience With Diesel-Electric Locomotives. C. H. Griffith and E. H. Pfeil. *Electrical Engineering*, v. 71, July 1952, p. 650-652. (A condensation. To be published in AIEE Transactions, v. 71, 1952.)

Four different makes of locomotive, totalling 197 units operating on over 3000 miles of railroad, furnish the basis of this report on troubles encountered.

10659a* The Bristol "Proteus III" (Series 700) Propeller Turbine. *Engineer*, v. 193, June 13, 1952, p. 791-793.

Includes photographs, perspective drawing, and performance data (tables and graphs.)

10660* Rotational Effects on a Cascade of Aerofoil Blades. K. H. Khalil. *Engineer*, v. 193, June 20, 1952, p. 831-834.

Above cascade was rotated in a wind tunnel. Pressure-distribution diagrams round the blade section were obtained at various angles of incidence by changing one or both components of flow. The question of blade number in the cascade and optimum pitch is discussed in the light of results as compared with static tests on the same blades with the cascade stationary. Effect of shrouding on pressure distributions and forces was also studied.

10661* Explosions in Engine Crankcases. John Lamb. *Engineering*, v. 173, May 16, 1952, p. 632-633; May 23, 1952, p. 661-662; May 30, 1952, p. 695-698. (A condensation.)

Discusses prevention of explosions, ventilated vs. sealed crankcases, prevention of hot bearings and pistons, prevention of injury due to explosion, and quenching of flames. Diagrams and illustrations.

10662* Analysis of the Performance of the Jenbach Two-Stroke Vertical Oil Engine. S. J. Davies. *Engineering*, v. 173, June 13, 1952, p. 738-740; June 20, 1952, p. 768-771; June 27, 1952, p. 802-803.

Engine now being built by an Austrian firm. Detailed diagrams, illustrations, performance charts, and tables.

10663 Added Kick for Turbojet Engines. G. W. Lawson and W. C. Alexander. *General Electric Review*, v. 55, July 1952, p. 38-39.

Tells how additional thrust is accomplished by liquid injection. The liquid—a water and alcohol mixture—increases the energy available in gases leaving the burner.

10664 Autoignition Properties of Certain Diesel Fuels. J. Enoch Johnson, John W. Crellin, and Homer W. Carhart. *Industrial and Engineering Chemistry*, v. 44, July 1952, p. 1612-1618.

Describes a laboratory method capable of utilizing small quantities of fuel for study of the relationship between fuel composition and ignition properties and other factors influencing ignition. Apparatus, procedure, and results are discussed. Numerous graphs. 18 ref.

10665* Wear of Fuel Injection Equipment and Filtration of Fuel for Compression-Ignition Engines. A. E. W. Austen and B. E. Goodridge. *Institution of Mechanical Engineers, Proceedings* (Automobile Div.), pt. 3, 1950-1951, p. 85-95; disc., p. 95-104.

A study dealing with dependence of wear of fuel-injection equipment on abrasive-particle size. Considers: mechanism of wear; properties of filters; nature and particle sizes of solids in fuels; effect of filters in reducing abrasive wear; review of service experience with current filters; choking properties of filter materials; and a hypothesis of the choking mechanism. Graphs, diagrams, tables, interference and other photomicrographs.

10666* Dynamic Stability of a Missile in Rolling Flight. Ray E. Bolz. *Journal of the Aeronautical Sciences*, v. 19, June 1952, p. 294-403.

Gives the equations of motion for a symmetric rolling missile with respect to axes attached to the missile. Applicable to jet (or rocket) missiles, propelled or coasting under accelerating or decelerating conditions. Summarized results present general stability criteria.

10667* Pre-Flame Reactions in Diesel Engines. Part I. F. H. Garner, Frank Morton, A. H. Nissan, and E. P. Wright. **Part II.** F. H. Garner, W. E. Malpas, Frank Morton, W. D. Reid, and E. P. Wright. *Journal of the Institute of Petroleum*, v. 38, May 1952, p. 301-329; disc., p. 329-343.

Effect upon cetane number of a number of typical diesel fuels of various additives when added to the fuel and when added with the intake air. Six gas oils were chosen to give a range of chemical composition from paraffinic through paraffin-aromatic to naphthenic-type oils. Tests were made with several gases and a large number of organic compounds in a CFR F5 diesel-fuel test engine and in a Crossley-type BVD-1 single-cylinder engine with a Ricardo "Comet" type-precombustion chamber. In Part II, pre-flame reactions occurring in the diesel engine with selected fuels, with and without addition of ignition accelerators, were studied. Describes construction and operation of a sampling valve designed primarily to suit the Crossley engine. Using this valve, samples were taken from the precombustion chamber of the engine at various positions of the stroke with a series of diesel fuels. The samples were analyzed for peroxide and aldehyde content as well as for O_2, CO_2, CO, and unsaturated hydrocarbons. Results are discussed in relation to the combustion processes, as indicated by pressure diagrams obtained during the sampling runs. 25 ref.

10668* Stability of Flow in a Rocket Motor. *Journal of Applied Mechanics*, v. 19 (*Transactions of the American Society of Mechanical Engineers*, v. 74), Mar. 1952, p. 125-126.

Discussion by S. Sherman, of the above paper by D. F. Gunder and D. R. Friant (Sept. 1950 issue).

10669* Efficiency of Gas-Turbine Locomotives. J. L. Koffman. *Railway Gazette*, v. 96, June 27, 1952, p. 709-712, 714.

Discusses effect of design features on fuel consumption. Table compares British, Swiss, and American units. 5 basic thermodynamic cycles are presented and discussed. Numerous graphs.

10670* Free-Piston Engines. A. L. London. *Research Reviews* (Office of Naval Research), Mar. 1952, p. 8-15.

Discusses current status and problems of above. Diagrams and photographs.

10671 Breathing Beats Squeezing in Boosting Engine Output. *SAE Journal*, v. 60, June 1952, p. 25-27. (Based on "New Horizons in Engine Development", by James C. Zeder, to be published in full in *SAE Quarterly Transactions*.)

Volumetric-efficiency path is extolled as best way to hike engine output. Tells how it's used in the Chrysler Firedome V-8 engine. Graphs and illustrations.

21. *Prime Movers*

10672 How to Design Fuel Injection Equipment. *SAE Journal*, v. 60, June 1952, p. 31-35. (Excerpts from "Design and Application of Diesel Fuel Injection Equipment", by Sidney E. Miller.)

Applied to a typical truck engine. Clarified by diagrams and graphs.

10673 Power Booster Fuels for Diesel Engines. *SAE Journal*, v. 60, June 1952, p. 42-43; disc., p. 43-45. (Based on "Power Booster Fuels for Diesels", by E. J. McLaughlin, P. L. Pinotti, and H. W. Sigworth.)

10674* Gas Turbine Heralds New Era in Automotive Transportation. Andrew E. Rylander. *Western Machinery and Steel World*, v. 43, June 1952, p. 106-109.

Describes Boeing Airplane Co.'s gas turbine weighing 240 lbs. and delivering 174 hp. Has been tested in a semi-trailer truck, Navy personnel boat, and a helicopter. Photographs and diagrams.

Miscellaneous Publications

10675 An Approximate Method of Determining the Subsonic Flow in an Arbitrary Stream Filament of Revolution Cut by Arbitrary Turbomachine Blades. Chung-Hua Wu, Curtis A. Brown, and Vasily D. Prian. National Advisory Committee for Aeronautics, Technical Note 2702, June 1952, 46 pages. (TL570 Un3t)

Mathematical method is illustrated with examples of compressible flow in a turbine cascade and in a centrifugal compressor. Tables and graphs. 10 ref.

10676 Effect of Compressor-Outlet Air Bleed on Performance of a Centrifugal-Flow Turbojet Engine With a Constant-Area Jet Nozzle. Sidney C. Huntley. National Advisory Committee for Aeronautics, Technical Note 2713, June 1952, 20 pages. (TL570 Un3t)

Calculated by use of analysis based on experimentally determined characteristics. Engine speeds from 0.9 to 1.0 of rated speeds and air-bleed rates from 0 to 0.10 of compressor air flow are considered at a flight Mach number of 0.52 and an altitude of 24,000 ft.

10677 Two-Dimensional Steady Nonviscous and Viscous Compressible Flow Through a System of Equidistant Blades. Hans J. Reissner, Leonard Meyerhoff, and Martin Bloom. National Advisory Committee for Aeronautics, Technical Note 2718, June 1952, 48 pages. (TL570 Un3t)

Theoretical, mathematical analysis, including numerical example.

10678 Comparison of High-Speed Operating Characteristics of Size 215 Cylindrical-Roller Bearings as Determined in Turbojet Engine and in Laboratory Test Rig. E. Fred Macks and Zolton N. Nemeth. National Advisory Committee for Aeronautics, Research Memorandum E51I05, Nov 28, 1951, 33 pages. (TL782 Un3rm)

Graphs, tables, diagrams, and illustrations.

10678a Design of Apparatus for Determining Heat Transfer and Frictional Pressure Drop of Nitric Acid Flowing Through a Heated Tube. Bruce A. Reese and Robert W. Graham. National Advisory Committee for Aeronautics, Research Memorandum 52D03, June 16, 1952, 61 pages. (TL782 Un3rm)

Presents design basis for test apparatus to determine heat-transfer and pressure-drop characteristics of white fuming HNO_3 flowing in a heated-tube section. Heat flux to the tube will be of the order of magnitude occurring in a regeneratively cooled rocket engine. Graphs, diagrams, and illustrations. 18 ref.

Books

10679 Flight Without Formulae; How and Why an Aeroplane Flies Explained in Simple Language. Ed. 2. A. C. Kermode. 254 pages. 1951. Sir Isaac Pitman & Sons, Ltd., London. (TL670 K45f2)

Brought up to date by inclusion of sections on "Jet Propulsion" and "Flight at Supersonic Speeds." All mathematical formulas have been excluded, in order to explain the subject as simply and attractively as possible to the beginner. Numerous illustrations and schematic diagrams.

10680 Die elektrische Ausrüstung des Kraftfahrzeuges. Erster Teil. Zündung. (The Electrical Equipment of the Automobile. Part I. Ignition System.) Ed. 3. Erich Klaiber. 382 pages. 1950. Technischer Verlag Herbert Cram, Berlin, Germany. (TL272 T69c3)

Discusses history and theory of ignition, commercial ignition-system parts, operation and sources of trouble. Includes parts, operation, installation, and care of spark plugs. Numerous photographs, drawings, tables, and references.

See also:
10567 (high temperature materials for gas turbines)
10599 (electrolytic conversion of coal to electricity)
11253 (engines for farm machinery)

22. CERAMICS

10681* Mullite-Carborundum and Corundum-Carborundum Refractories. (Russian.) P. P. Budnikov and V. I. Khramova. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 11, 1952, p. 325-328.

Various clay and kaolin mixtures with coke were fired so as to produce various mixtures of the above. Tests were made on the refractoriness and electroconductivity of the brick. Data are tabulated and charted.

10682* Reactions of Sodium Sulfate With Alumina-Silica Refractories. Wingate A. Lambertson. *Journal of the American Ceramic Society*, v. 35, July 1952, p. 161-165.

In relation to the slagging of refractories in Naval boilers burning fuel oil, rates of reaction were investigated under varied conditions of time, temperature, concentration, and atmosphere. Diagrams, graphs, and tables. 11 ref.

10683* Composition of Low-Alkali Glass. Bumpei Yoshiki and Royozo Yoshida. *Journal of the American Ceramic Society*, v. 35, July 1952, p. 166-169.

A new chemical-ware glass was developed which contains no boric oxide and little alkali and yet melts easily, following the ternary melting diagram of albite-diopside-wollastonite. It was produced on an industrial scale without using soda ash by utilizing natural rocks (particularly albitrite), which had previously been an unexploited natural resource. Tables and diagrams.

10684* Surface Tension of Molten Alkali Borates. Leo Shartsis and Webster Capps. *Journal of the American Ceramic Society*, v. 35, July 1952, p. 169-172.

A study, using a maximum pull-on-cylinder method, to determine effects of temperature and composition on surface-tension phenomena, and relation between latter and expansivity. Data are given on the relation between ionic potential and two-liquid formation. Graphs and tables.

10685* Study of Silica Brick From a Glass Tank Crown. E. S. Chrzan, E. C. Petrie, and S. M. Swan. *Journal of the American Ceramic Society*, v. 35, July 1952, p. 173-181.

A study of silica brick after use, to learn the mechanism of attack and suggest types of improvement lengthening crown life and reducing formation of stones and cords resulting from corrosion. Charts, tables, and photographs.

10686* Fundamental Aspects in Research on Titania-Opacified Enamels. Sandford S. Cole. *Journal of the American Ceramic Society*, v. 35, July 1952, p. 181-188.

Discusses factors and concepts concerned in improving the above. Graphs and table. 31 ref.

10687 Properties and Structures of Vitreous and Crystalline Boron Oxide. Kasimir Fajans and Stephen W. Barber. *Journal of the American Chemical Society*, v. 74, June 5, 1952, p. 2761-2768.

A foundation is given for understanding of the "anomalies" of boron-containing glasses. Consideration of the properties of boron oxide and its analogs is based on the assumption of electric forces acting between more or less strongly polarized ions. 47 ref.

10688 Some Possibilities of Scientific Control in the Heavy Clay Industries. G. H. Whiting. *Transactions of the British*

Ceramic Society, v. 51, May 1952, p. 269-284; disc., p. 284-292.

Discusses the history and development of the Fletton brick-making industry, a comparatively recent British development based on use of a plentiful British clay, stressing scientific control. Various specific operations are considered as being especially applicable to control. Graphs, photographs, diagrams, and floor plan of research laboratories.

10689 The System Al_2O_3-TiO_2-SiO_2. Y. M. Agamawi and J. White. *Transactions of the British Ceramic Society*, v. 51, May 1952, p. 293-322; disc., p. 322-325.

A preliminary investigation of the melting relationships in the above system was carried out by determining cone-fusion points of some 67 compositions. The effect of TiO_2 on liquid formation in fireclays of the Ayrshire bauxite type was also studied and it was found that the increase of liquid content due to the presence of TiO_2 up to 4% is relatively small. Numerous tables and graphs. 15 ref.

10690 Cadmium and Selenium Pigments in Porcelain Enamels. III. Paul A. Huppert. *Ceramic Age*, v. 59, June 1952, p. 55, 58.

Part III discusses: red and yellow pigments—not Cd based; Cd-Se compounds in ruby glasses; and a special multicolor application. (To be continued.) 13 ref.

10691 Experiments in Making Light-Weight Brick. Paul E. Cox. *Ceramic Age*, v. 59, June 1952, p. 70, 72.

10692* International Ceramic Congress: Technical Session—Summaries of Papers Presented at Meetings of the Heavy Clay and Scientific Sections. *Claycraft*, v. 25, June 1952, p. 476-486.

Covers Congress held in Paris, May 12-17, 1952.

10693 Testing for Enamel Coating Discontinuities. Stanley C. Orr. *Finish*, v. 9, July 1952, p. 23-26, 63-64.

Describes and discusses various methods for the above, including instrumental procedures. Schematic diagrams.

10694 On Composition of Non-Alkali and High Manganous Oxide Glass. Bumpei Yoshiki. *Glass Industry*, v. 33, July 1952, p. 353-355, 376.

Because Japan lacks boron resources, compositions of non-boron and non-alkali glasses were studied, for use in manufacture of glass-fiber insulators and other electrical-insulating materials. Numerous tables.

10695 Tristrontium Silicate—A New Compound. R. W. Nurse. *Journal of Applied Chemistry*, v. 2, May, 1952, p. 244-246.

Preparation of this new compound is described and optical properties and x-ray spacings are given. A comparison is made between $3SrO \cdot SiO_2$ and $3CaO \cdot SiO_2$, the principal cementing compounds in Portland cement.

10696 The Strength of Glass Fibers. (Russian.) A. F. Zak and Iu. P. Man'ko. *Legkaia Promyshlennost*, v. 12, Jan. 1952, p. 32-34.

Tensile tests were made on a series of glass fibers and threads. Data are tabulated and charted.

10697* Influence of Defects in the Glass Mass on the Strength of Elementary Glass Fibers. (Russian.) A. F. Zak and Iu. P. Man'ko. *Legkaia Promyshlennost*, v. 12, Feb. 1952, p. 38-40.

Chemical nonuniformity and inclusions of gases and crystalline impurities were investigated with respect to the strength of glass fibers. Data are tabulated and charted.

10698 The System Beryllia-Alumina-Titania: Phase Relations and General Physical Properties of Three-Component Porcelains. S. M. Lang, C. L. Fillmore, and L. H. Maxwell. *Journal of Research of the National Bureau of Standards*, v. 48, Apr. 1952, p. 298-312.

14 references.

10699 Surface Changes in an Original and Activated Bentonite. Juan de Dios Lopez-Gonzalez and Victor R. Deitz. *Journal of Research of the National Bureau of Standards*, v. 48, Apr. 1952, p. 325-333.

Physical adsorption of N_2 was used to study a bentonite activated by treatment with HCl. The BET equation, the Hüttig equation, and a so-called "summation" equation were used in calculation of surface areas available to N_2. Changes in surface area at different temperatures are related to quantity of adsorbed water and to amount of constitutional hydroxyl groups. Chemical analyses, dehydration curves, differential thermal analyses, x-ray patterns, and electron micrographs were employed to characterize the materials. 33 ref.

10700 Prestressed Concrete. O. J. Masterman. *Nature*, v. 169, May 31, 1952, p. 901-905.

Discusses above, dealing with principles, methods, equipment, materials, economics, and uses. Photographs and diagrams.

10701* Pozzolans for Oil-Well Cements. William P. Sterne. *Oil and Gas Journal*, v. 51, July 7, 1952, p. 72-73, 76.

Discusses use of artificial and natural pozzolans as additives to portland cement. Advantages include low heat of hydration, improved strength, and resistance to sulfates.

10702* Thermal and Electrical Conductivities of Carbon Materials. S. Mizushima. *Physical Review*, ser. 2, v. 86, June 15, 1952, p. 1040.

Physical changes and crystallite sizes of coke specimens were measured to test the relationship that the large difference in thermal conductivity between so-called amorphous carbon and graphite is due to difference in crystallite sizes. Graph.

10703* A Note on Fused Stabilized Zirconia: A Modern High-Temperature Refractory. N. Clarke Jones. *Refractories Journal*, May 1952, p. 214-216, 218.

Briefly describes manufacture, properties, and applications.

10704* Lightweight Building Units of Autoclaved Lime and Siliceous Material. Eric Ahlstedt. *Rock Products*, v. 55, June 1952, p. 106-110.

Tells how International Ytong Co., Sweden, manufactures chemically aerated lightweight block and precast floor, roof, and insulation units. Name of the material is "Ytong." Considers production, construction, material characteristics, etc. Photographs, schematic diagrams, graphs, and tables.

10705* Temperature Variation of the Elastic Moduli of Glass. J. V. Fitzgerald, K. M. Laing, and G. S. Bachman. *Journal of the Society of Glass Technology* (Transactions Section), v. 36, Apr. 1952, p. 90-104.

Shows how the concept of anelasticity can be used to advantage to get a better understanding of the mechanical behavior of glass, particularly variation of shear modulus with temperature. Numerous graphs.

10706* Creep and Recovery of a Mineral Glass at Normal Temperatures. *Journal of the Society of Glass Technology* (Transactions Section), v. 36, Apr. 1952, p. 105-114.

Measurements were made of the creep and recovery of a soda-lime-silica glass in the range 20-80°C. Numerous graphs.

10707* Transmission of Radiation Through Glass in Tank Furnaces. B. S. Kellett. *Journal of the Society of Glass Technology* (Transactions Section), v. 36, Apr. 1952, p. 115-123.

The mechanism of absorption and re-radiation of energy suggested in 1947 by F. W. Preston as a means by which heat is carried through hot glass is analyzed mathematically. 13 ref.

10708* Plate Enamels of Low Melting Point. (German.) A. Thürmer. *Sprechsaal für Keramik; Glas; Email*, v. 85, June 5, 1952, p. 252-253.

Discusses the relative merits of various additions to enamel, with particular regard to their effect on melting point. Data are tabulated.

10709 Coating Extends Pipe Life. *Steel*, v. 131, July 7, 1952, p. 98, 100.

Tells how the use of porcelain enamel prolongs black-steel pipe life 12-20 times in Al fluxing and degassing operations.

22. *Ceramics*

10710* Mixed Clay-Kaolin Bodies for Glass-Tank Blocks and Heat Radiators. (Russian.) N. V. Solomin. *Steklo i Keramika,* v. 9, Jan. 1952, p. 7-10.

Tests were made on the properties of clay-kaolin mixtures for use in glass-furnace construction. Data are tabulated.

10711* Production of Ceramic Sewer Pipe From Low-Fusion-Point Clays With Non-Lead Glazes. (Russian.) M. I. Zaritseva. *Steklo i Keramika,* v. 9, Feb. 1952, p. 12-13.

Tests were made of the above for regions where there are no high-grade clay deposits. Compositions and properties for various firing temperatures between 900 and 1100°C. are tabulated.

10712* Production Tests on Various Refractory Materials in the Brickwork of Regenerators of Glass Furnaces. (Russian.) A. I. Polinkovskaia and N. V. Solomin. *Steklo i Keramika,* v. 9, Mar. 1952, p. 3-5.

Several types of refractory brick were tested. Results are tabulated and illustrated.

10713* Rapid Determination of Moisture in Raw Materials and Glass Batches by a Thermal-Analysis Method. (Russian.) I. D. Tykachinski and A. N. Afanas'ev. *Steklo i Keramika,* v. 9, Mar. 1952, p. 6-8.

Describes method and apparatus for the above. Typical results are charted.

10714* Method for 100% Quality Control of Spark-Plug Insulators. (Russian.) A. D. Usanov. *Steklo i Keramika,* v. 9, Mar. 1952, p. 16-19.

Describes method and equipment for the above. Typical data are charted and tabulated.

10715* The Role of Feldspar in the Formation of the Structure of Porcelain. (Russian.) P. P. Budnikov and Kh. O. Gevorkian. *Steklo i Keramika,* v. 9, Mar. 1952, p. 19-20.

10716* Articles With Crystalline and Glass-Like Structures From Low-Fusion-Point Clays. (Russian.) E. M. Kalenov and T. T. Trotsko. *Steklo i Keramika,* v. 9, Apr. 1952, p. 3-8.

Discusses the use of above clays as raw materials in the ceramic and glass industry. Research has been undertaken in several glass factories and institutions to test the suitability of Spondil clays for the manufacture of glass tubing, bottles, foam glass, mineral wool, and other vitreous and crystalline products. Some details of tests with two typical clays (Staikovsk and Petrovsk) are given, the former containing 33.58% SiO_2 and 27.5% CaO and the latter with 55.22% and 11.97%, respectively. Facing bricks or slabs, tiles, and insulating material for strength equal to that of structural glass were made, to which glaze or enamel can be added.

10717 The Use of Sandstone in Glass Making. (Russian.) E. P. Ozhigov, K. G. Maidel, and A. N. Dorokhina. *Steklo i Keramika,* v. 9, Apr. 1952, p. 10-11.

Discusses methods of treating various sandstones for use in glassmaking. Data are tabulated.

10718 Surface Tension of Glass in the Highly Viscous State. (Russian.) M. V. Okhotin and I. G. Bazhbeuk-Melikova. *Steklo i Keramika,* v. 9, Apr. 1952, p. 12-14.

Four methods of studying the surface tension of glass are described and discussed. Tables and graphs.

10719 Methods of Investigating the Structural-Mechanical Properties of Ceramic Bodies. (Russian.) S. P. Nichiporenko and L. B. Shabashkevich. *Steklo i Keramika,* v. 9, Apr. 1952, p. 14-17.

Several methods are discussed. Tables and graphs.

10720* Ways of Improving the Light Transmission of Glass. (Russian.) K. T. Bondarev. *Steklo i Keramika,* v. 9, May 1952, p. 3-6.

The roles of the FeO-Fe_2O_3 ratio on the transparency of glass and ways of controlling it are discussed. Various mixtures of raw materials and typical properties are tabulated.

10721* Investigation of the Influence of Various Additions to Sulfate-Soda and Soda Batches on the Acceleration of the Glassmaking Process. (Russian.) L. Ia. Mazelev. *Steklo i Keramika,* v. 9, May 1952, p. 6-10.

The influence of 41 different salts and oxides on the glassmaking process was investigated. Data are discussed and charted.

10722* Effect of Grain Size of Sand on Concrete. III. (Norwegian.) Sven Thaulow. *Teknisk Ukeblad,* v. 99, Jan. 17, 1952, p. 51-54.

Includes charted and tabulated data on effect of composition on strength of concrete.

Miscellaneous Publications

10723 Report of Committee C-3 on Chemical-Resistant Mortars. American Society for Testing Materials, Preprint 18, 1952, 6 pages. (TA401 Am35p)

Includes proposed tentative specifications for sulfur mortar.

10724 Report of Committee C-8 on Refractories. American Society for Testing Materials, Preprint 20, 1952, 6 pages. (TA401 Am35p)

Includes proposed tentative test method for fireclay refractories in CO atmosphere.

10725 Report of Committee C-9 on Concrete and Concrete Aggregates. American Society for Testing Materials, Preprint 21, 1952, 63 pages. (TA401 Am35p)

Recommended revisions in standards and specifications. Results of cooperative cement-content determination and reactive aggregate tests. Proposed tentative test methods for aggregates and concretes. Tentative nomenclature for constituents of natural mineral aggregates.

10726 Efflorescence. F. O. Anderegg. American Society for Testing Materials, Preprint 23a, 1952, 7 pages. (TA401 Am35p)

Deals with above manifestation that occasionally appears on masonry walls. It may be relatively fugitive, may be removed by the first rain, or may remain on the surface permanently, but harmlessly, as far as integrity of the masonry is concerned. At times, serious disintegration of masonry is evident. An analysis is given of factors contributing to efflorescent phenomena.

10727 Cracking in Masonry Caused by Expansion of Mortar. J. W. McBurney. American Society for Testing Materials, Preprint 101, 1952, 20 pages. (TA401 Am35p)

Effect of free MgO in causing expansion of hardened masonry mortars is discussed. Concludes that delayed hydration of MgO can cause expansions of sufficient magnitude to produce severe cracking and structural damage in masonry. Some other causes of cracking are listed. Recommendations for the prevention of trouble from expansive mortars are offered. 19 ref.

10728 Correlation of Sodium Sulfate Soundness of Coarse Aggregate With Durability and Comprehensive Strength of Air-Entrained Concrete. C. A. Vollick and E. I. Skillman. American Society for Testing Materials, Preprint 104, 1952, 8 pages. (TA401 Am35p)

Coarse aggregates from 70 different sources were subjected to 5 cycles in the sodium sulfate soundness test. The same aggregates were also used to fabricate cylinders of air-entrained concrete having uniform grading and water-cement ratio. ⅓ of the cylinders were tested for 28-day compressive strength and ⅓ were subjected to alternate cycles of freezing and thawing. Test results were studied from the standpoint of relationships between the principal variables.

10729 Experimental Exposure of Concrete to Natural Weathering in Marine Locations. Herbert K. Cook. American Society for Testing Materials, Preprint 105, 1952, 12 pages. (TA401 Am35p)

More than 2500 concrete test specimens were exposed to natural weathering at 4 exposure stations during the past 16 yrs. by the Concrete Research Division of the Waterways Experiment Station and its predecessor laboratories. The principal stations are located in Maine and Florida on the Atlantic Coast. Findings charted, tabulated, and discussed. 10 ref.

10730 Report on Further Studies to Develop an Accelerated Test Procedure for the Detection of Adversely Reactive Cement-Aggregate Combinations. Thomas E. Stanton.

American Society for Testing Materials, Proceedings, v. 51, 1951, p. 1087-1096. (TA401 Am35p)

Tests recorded have been under way for over 1 yr., with reactive aggregates from numerous sources.

10731 Aggregates Tested by Accelerated Freezing and Thawing of Concrete. W. H. Price and D. G. Kretsinger. *American Society for Testing Materials, Proceedings*, v. 51, 1951, p. 1108-1118; disc., p. 1118-1119. (TA401 Am35p)

Automatic freezing-and-thawing apparatus used for testing concrete in the laboratory of the Bureau of Reclamation at Denver is described and the results are compared with those obtained with the manually operated apparatus used prior to 1946. The procedure is outlined, and results obtained with aggregates from a number of projects are presented.

10732 Performance of Automatic Freezing-and-Thawing Apparatus for Testing Concrete. Stanton Walker and Delmar L. Bloem. *American Society for Testing Materials, Proceedings*, v. 51, 1951, p. 1120-1135; disc., p. 1135-1140. (TA401 Am35p)

Design features, operation, and performance characteristics of above apparatus are described. Data from several investigations are presented.

10733 Use of the Soniscope for Measuring Setting Time of Concrete. E. A. Whitehurst. *American Society for Testing Materials, Proceedings*, v. 51, 1951, p. 1166-1176; disc., p. 1176-1183. (TA401 Am35p)

Four cements were used in study of the above, believed to offer excellent possibilities for studying the behavior of green concrete.

10734 Method of Making Vibrated Dry-Tamp Concrete Cylinders Applied to Tests of Lightweight Aggregate and Block Mixtures. S. B. Helms and A. L. Bowman. *American Society for Testing Materials, Proceedings*, v. 51, 1951, p. 1184-1195; disc., p. 1196. (TA401 Am35p)

The Vibratamp apparatus was developed for use in laboratory investigation of lightweight aggregates where standardized specimens are required. Hand-tamped units are of questionable value in comparisons where reproducibility is essential. Typical results are tabulated, charted, and illustrated.

10735 Physical Properties of Plasticized Sulfur Cements. A. C. Loewer, W. J. Eney, R. Seymour, and W. Pascoe. *American Society for Testing Materials, Proceedings*, v. 51, 1951, p. 1234-1247. (TA401 Am35p)

Pouring temperature, reheating and aging effect, creep, and stress-strain relationships in tension and compression were studied.

10736 Investigation of System MgO-CaO-TiO_2-SiO_2. (From the Point of View of Its Utilization in the Technology of Super Refractories.) III. Sintering Behavior and Rate of Growth in Recrystallization of Refractory Compounds. Properties of Refractory Products in System MgO-CaO-TiO_2-SiO_2. A. S. Berezhnoi. Henry Brutcher, Translation No. 2845, 18 pages. (From *Ogneupory*, v. 15, Nov. 1950, p. 493-504.)

10737 Preliminary Report on Coated Lightweight Concrete Aggregate From Canadian Clays and Shales. Part II. Manitoba and Saskatchewan. J. G. Matthews. Mines Branch, Canada Department of Mines and Technical Surveys, Memorandum Series 120, Apr. 1952, 51 pages. (TN41 C16m)

Books

10738 Manual of ASTM Standards on Refractory Materials. 294 pages. 1952. American Society for Testing Materials, Philadelphia. (TN677 Am34m)

10739 Comprehensive Bibliography of Cement and Concrete, 1925-1947. Floyd O. Slate. 491 pages. Joint Highway Research Project, Engineering Experiment Station, Purdue University, Lafayette, Ind. (Z5853.M4 SL14c)

Purpose is to list substantially the complete world literature of the fields of cement and concrete appearing during the interval Jan. 1, 1925, to Jan. 1, 1948. Since compilation was made primarily from secondary sources, the latter part of 1947 is not covered completely. It is probable that coverage of foreign literature, particularly German and Russian, is not complete through the war years. The listing is within the framework of a classification outline. Includes author index.

See also:

9932 (thermodynamics of Fe-silicate slags)
9944 (conductivity of molten silicates)
9945 ("All-Basic Openhearth Furnace"—symposium)
9976 (basic refractories for cupolas)
10058 (metal coating of ceramics)
10567 (ceramics for gas turbines)
10639 (kiln processing of nonmetallics)
10642 (thermal insulating materials)
10968 (acylation of bentonite clay)
11010 (chemistry of silicon and silicates—book)
11074 (glass reinforced plastics)
11086 (vinylsilicone resin treatment of glass fibers)
11106 (strength of glass laminates at high temperatures)
11107 (strength of glass-fabric laminates)
11108 (adhesive for glass-resin laminates)
11117 (electrical insulating materials—ASTM report)
11423 (metal-on-glass electrical resistors)
11458 (ceramic magnetic material—cubic ferrites)

23. LUBRICATION AND FRICTION

10740 The Theory of Rolling. (Russian.) D. V. Konvisarov. *Doklady Akademii Nauk SSSR*, new ser., v. 83, Mar. 21, 1952, p. 369-371.

A study was made of rolling friction. Data are discussed and charted.

10741 The Law of Static Friction. (Russian.) S. B. Ratner. *Doklady Akademii Nauk SSSR*, new ser., v. 83, Mar. 21, 1952, p. 443-446.

Friction tests were made on rubber with metals, plexiglas, and other materials. Coefficient of friction was found to change with a change of the load. Data are charted and discussed.

10742* Catalytic Effect of Several Metals on the Oxidation of Lubricating Oils. D. W. Sawyer. *Transactions of the American Society of Mechanical Engineers*, v. 74, Jan. 1952, p. 113-119; disc., p. 119-122.

Considerable evidence has accumulated to show that Al is especially well adapted for construction of many types of equipment for handling lubricating oils such as sumps, coolers, pistons, pumps, crankcases, and tubing. Compares the effects of various metals and alloys on properties of lubricating oils at several temperatures. It appears that Al alloys and stainless steel have only a very slight or no catalytic effect on oxidation of mineral oils and are more resistant than many of the other metals evaluated. Copper and low-carbon steel were found definitely to have an adverse effect upon properties of the oils.

10743* Modern Techniques in Petroleum Testing. X. Mechanical Tests for Lubricants. H. L. Bingham. *Institute of Petroleum Review*, v. 6, June 1952, p. 207-213.

Discusses only those tests used for turbine oils and hydraulic fluids. Tables and diagrams.

10744* Fretting Corrosion Studies With a Modified Fafnir Machine. T. G. Roehner and E. L. Armstrong. *Institute Spokesman*, v. 16, June 1952, p. 8-9, 11-12, 15.

Compares original and modified Fafnir testers. Describes test procedure and gives results of tests on 11 lubricating grease-additive combinations.

10745* An Electrical Method for Determining Journal-Bearing Characteristics. D. S. Carter. *Journal of Applied Mechanics*, v. 19 (*Transactions of the American Society of Mechanical Engineers*, v. 74), Mar. 1952, p. 114-118.

Describes a method for the solution of Reynolds equation for the pressure distribution in the oil film of a journal bearing. Electrical measurements are made as determined by an analogy between terms of an equation and currents in an electrical network. Diagrams and tables.

10746* The Calculated Performance of Dynamically Loaded Sleeve Bearings. III. *Journal of Applied Mechanics*, v. 19 (*Transactions of the American Society of Mechanical Engineers*, v. 74), June 1952, p. 239-242.

Discussion, including author's reply, of above paper by J. T. Burwell (Dec. 1951 issue). Graphs.

23. *Lubrication and Friction*

10747* Sol-Thixotropic Behavior of Liquid Lubricants. (German.) F. W. Häussler. *Kolloid Zeitschrift*, v. 126, May 1952, p. 102-103; disc., p. 103.

Briefly shows that the viscosity of lubricating oils is affected not only by temperature, pressure, and velocity drop, but also by mechanical stress, followed by periods of rest, called sol-thixotropy.

10748* The "Static Supporting Strength" of Lubricating Oils and a "New Oil Index." (German.) L. Ubbelohde, Hans Neumann, and Frau de Jong. *Kolloid Zeitschrift*, v. 126, May 1952, p. 120-140.

The various sections discuss friction in friction bearings, adsorption, determination of the "Thickness-Pressure function," results of the measurements, a "new oil index", an attempt to explain the measured results from a molecular-physical point of view, the higher state of order in the "boundary layers" freely adsorbed at a wall, the "intermediate layer" and the "boundary layer" in friction bearings, and some indications on the constitution of oils suitable for boundary lubrication. Diagrams and graphs. 59 ref.

10749* The Elektrion Process. Michel Roegiers. *Petroleum*, v. 15, July 1952, p. 179-185.

Describes the history and mechanism of "Elektrionisation" and its important effects on lubricating oils. Table and photographs.

10750 Take a Look at Lime-Base Greases Through an Electron Microscope. W. A. Cunningham and M. A. Vela. *Petroleum Refiner*, v. 31, June 1952, p. 110-112.

Illustrates specimens of 6 lime-base greases made by the same process in the same plant. Points out potential value in lubricating-grease studies. 13 ref.

10751* Contribution to the Study of Alteration Products of Lubricating Oils. (French.) E. Matsas. *Revue de l'Institut Français du Pétrole et Annales des Combustions Liquides*, v. 7, Apr. 1952, p. 83-95.

Presents data on flocculation of suspensions in used oils and on constitution of the resulting products. Some chemical functions were characterized in fractions obtained by electrophoresis. These groups explain the action of some flocculating agents. 23 ref.

10752* Experimental Testing of Lubricants. (Italian.) C. Casci. *Rivista dei Combustibili*, v. 6, Apr. 1952, p. 248-259.

Describes engine tests of lubricants, carried out with various diesel-engine types at the Koninklijke Shell Laboratory, Delft. Possibilities of these tests are discussed, particularly difficulties of evaluation of the results. Diagrams and illustrations.

10753 Smooth Surfaces Don't Always Give Least Wear. *SAE Journal*, v. 60, June 1952, p. 57-60; disc., p. 60. (Excerpts from "Surface Finish—Its Effect on Wear", by C. R. Lewis.)

Research studies show that smooth surfaces wear more slowly than rough ones under ideal laboratory conditions. However, in applying the results to production machinery, it is necessary to exercise considerable caution. In many cases, fits of wearing surfaces are seldom those envisaged by designers, and best results are obtained by allowing some initial roughness. Effects of secondary influences were studied. Graphs.

See also:
10334 (lubricant corrosion of engines and gears)
10678 (roller bearings in turbo-jets)
10796 (bearing problem in high-speed gears)
10874 (ASTM lubricant test methods)
11117 (electrical insulating materials—ASTM report)

24. DESIGN

10754* Thin Multi-Walled Sections: Finding the Distribution of Direct Shear Stress and the Position of the Flexural Axis. William Morse. *Aircraft Engineering*, v. 24, June 1952, p. 170-172.

Explains method for above for a 2-cell and a 3-cell section. Diagrams.

10755* Effect of Taper on Screw-Thread Load Distribution. E. E. Stoeckly and H. J. Macke. *Transactions of the American Society of Mechanical Engineers*, v. 74, Jan. 1952, p. 103-112.

Load distribution on the threads of bolts and nuts, made in the conventional constant-pitch manner and with tapered threads, was determined experimentally and theoretically. Results indicate that substantial improvement in thread-load distribution can be made by tapering the thread of either the bolt or nut. Material improvement in bolting strength is obtained in applications normally conducive to little plastic flow and thus liable to brittle fractures, with dynamic loads or static loads at elevated temperatures. Operational experiences are cited to substantiate indicated improvements.

10756* Stresses in a Pressure Vessel With a Conical Head. G. W. Watts and H. A. Lang. *Transactions of the American Society of Mechanical Engineers*, v. 74, Apr. 1952, p. 315-324; disc., p. 324-326.

Results of computations on the above. The bending theory of shells is used to evaluate local bending stresses in the neighborhood of the junction of the conical head and the cylindrical body. Tables show magnitudes of shear stress, circumferential stress, and axial stress at the junction. Curves show the maximum stress for values of cone-apex angle, ratio of conical head thickness to cylinder thickness, and ratio of cylinder diameter to thickness.

10757* Analysis of Stresses and Displacements in Heat-Exchange Expansion Joints. Glenn Murphy. *Transactions of the American Society of Mechanical Engineers*, v. 74, Apr. 1952, p. 397-402.

Procedure for the above when the joint is assumed to be a surface of revolution.

10758* A New Type of Cover for High Pressure Containers and Its Calculation. (German.) G. Sonntag. *Chemie-Ingenieur-Technik*, v. 24, June 1952, p. 357-358.

A removable high-pressure cover is described in which the sealing is effected by means of a Cu ring. The transfer of pressure through the ring as well as bending stress caused in the container by sealing were determined.

10759* A Lightweight Air Compressor. *Engineer*, v. 193, June 6, 1952, p. 770-771.

Describes and illustrates compact 3-stage air compressor for pressures up to 3000 psi. It weighs only 10 lbs., and is primarily intended for use in operating aircraft auxiliary services, but has other applications. Graphs.

10760* The Calculation of Thick-Walled Cylindrical Shells of Carbon Steel Subject to Internal Pressure. W. P. Kerkhof. *Engineers' Digest*, v. 13, June 1952, p. 187-188, 196. (Translated and condensed from *Ingenieur*, v. 64, May 2, 1952, p. W21-W24.)

10761 Buckling of Continuous Beams on Elastic Supports. Edward Saibel. *Journal of the Franklin Institute*, v. 253, June 1952, p. 563-566.

The continuous beam having elastic intermediate supports, equally spaced and of equal stiffness, is solved for the condition that they behave as rigid supports when the beam buckles under the action of an axial compressive force. The exact solution is given in closed form. Diagrams.

10762 How to Use Bearing Components Instead of Complete Units. E. P. Stahl. *Iron Age*, v. 170, July 10, 1952, p. 131-134.

A number of applications have been developed in the automotive and other fields which use some of a bearing's components. They use either the bore or the shaft in place of the outer or inner bearing race. Drawings.

10763* Ripple-Type Buckling of Sandwich Columns. A. Cemal Eringen. *Journal of the Aeronautical Sciences*, v. 19, June 1952, p. 409-417.

The problem of local instability of thick sandwich columns having orthotropic cores is treated under two different types of loading. Calculations and curves are made for various types of cores employed in industry. Numerous graphs. 17 ref.

10764* The Bending of Uniformly Loaded Sectorial Plates With Clamped Edges. H. D. Conway and M. K. Huang.

Journal of Applied Mechanics, v. 19, (*Transactions of the American Society of Mechanical Engineers*, v. 74), Mar. 1952, p. 5-8.

Analyzes above using 2 different methods of superposition on the elementary solution for a uniformly loaded circular plate with a clamped edge.

10765* Bending of a Cylindrically Aeolotropic Circular Plate With Eccentric Load. A. M. Sen Gupta. *Journal of Applied Mechanics*, v. 19, (*Transactions of the American Society of Mechanical Engineers*, v. 74), Mar. 1952, p. 9-12.

Investigates the above problem under a concentrated load applied at a point at a distance from the center, the edge being clamped.

10766* Linear Bending Theory of Isotropic Sandwich Plates by an Order-of-Magnitude Analysis. George Gerard. *Journal of Applied Mechanics*, v. 19, (*Transactions of the American Society of Mechanical Engineers*, v. 74), Mar. 1952, p. 13-15.

Equilibrium and stress-strain relations for the faces and core of a sandwich plate are examined in terms of thickness of the plate. The analysis results in a set of simplified stress-strain relations, in addition to which the basic assumptions of previous sandwich-plate bending theories are obtained as the end result.

10767* Approximate Approach for Torsion Problem of a Shaft With a Circumferential Notch. H. Okubo. *Journal of Applied Mechanics*, v. 19, (*Transactions of the American Society of Mechanical Engineers*, v. 74), Mar. 1952, p. 16-18.

Approximate values for stresses on the surface of a shaft are found directly without solving the problem completely.

10768* The Effect of a Rigid Circular Inclusion on the Bending of a Thick Elastic Plate. R. A. Hirsch. *Journal of Applied Mechanics*, v. 19, (*Transactions of the American Society of Mechanical Engineers*, v. 74), Mar. 1952, p. 28-32.

Above 3-dimensional problem is solved approximately by the method of E. Reissner. Comparison is made with published data for the limiting cases of vanishing inclusion size and vanishing thickness. Graphs showing the transition from the plane-strain solution to the Poisson-Kirchoff solution are given.

10769* Several Approximate Analyses of the Bending of a Rectangular Cantilever Plate by Uniform Normal Pressure. W. A. Nash. *Journal of Applied Mechanics*, v. 19, (*Transactions of the American Society of Mechanical Engineers*, v. 74), Mar. 1952, p. 33-36.

22 references.

10770* Strsses and Deformations of Toroidal Shells of Elliptical Cross Section—With Applications to the Problems of Bending of Curved Tubes and of the Bourdon Gage. R. A. Clark, T. I. Gilroy, and E. Reissner. *Journal of Applied Mechanics*, v. 19, (*Transactions of the American Society of Mechanical Engineers*, v. 74), Mar. 1952, p. 37-48.

12 references.

10771* Torsion of Curved Beams of Rectangular Cross Section. H. L. Langhaar. *Journal of Applied Mechanics*, v. 19, (*Transactions of the American Society of Mechanical Engineers*, v. 74), Mar. 1952, p. 49-53.

Presents an exact solution of the above problem.

10772* The Theoretical Analysis of Metal-Forming Problems in Plane Strain. E. H. Lee. *Journal of Applied Mechanics*, v. 19, (*Transactions of the American Society of Mechanical Engineers*, v. 74), Mar. 1952, p. 97-103.

Plastic flow in plane strain of an ideally plastic material subjected to large strains is considered. Elastic strains are neglible and a rigid-plastic type of analysis is adopted. Indicates errors in solutions in the literature based on stress equations only. Includes appendix on determination of plastic-rigid boundary. 26 ref.

10773* The Optimum Problem of the Sandwich Plate. W. Flügge. *Journal of Applied Mechanics*, v. 19, (*Transactions of the American Society of Mechanical Engineers*, v. 74), Mar. 1952, p. 104-108.

Explains a method which shows how the dimensions of a plate should be chosen in order to obtain a favorable relation between its weight and the load carried. Graphs and diagrams.

10774* The Calculation of Rectangular Bar Helical Springs. A. M. Wahl. *Journal of Applied Mechanics*, v. 19, (*Transactions of the American Society of Mechanical Engineers*, v. 74), Mar. 1952, p. 119-122.

Formulas and charts are given for calculating deflection and stress in helical compression of tension springs of rectangular cross section taking curvature effects into account.

10775* Partially Plastic Thick-Walled Cylinder Theory. M. C. Steele. *Journal of Applied Mechanics*, v. 19, (*Transactions of the American Society of Mechanical Engineers*, v. 74), June 1952, p. 133-140.

Previous theories for above, under internal pressure, are reviewed. A quantitative comparison is given for compressibility vs. incompressibility of material, and von Mises' vs. Tresca's theory of failure. A theory is presented in closed form to include the Hencky stress-strain relations, incompressibility, and Ludwik's strain-hardening function. Graphs. 18 ref.

10776* On the Stress in a Notched Strip. Chih-Bing Ling. *Journal of Applied Mechanics*, v. 19, (*Transactions of the American Society of Mechanical Engineers*, v. 74), June 1952, p. 141-146.

Describes a simplified method for solution of an infinite system of linear equations encountered in earlier work. Applies method to solve the problem of a notched strip under transverse bending. Numerical results obtained are compared graphically with the experimental results available. Tables.

10777* The Limit Design of a Transversely Loaded Square Grid. Jacques Heyman. *Journal of Applied Mechanics*, v. 19 (*Transactions of the American Society of Mechanical Engineers*, v. 74), June 1952, p. 153-158.

Deals with the above limit design of grids, formed by two sets of parallel beams intersecting at right angles, subjected to transverse loading at the joints. This form of loading introduces both bending and twisting moments in the beams, and modes of failure under these combined actions were investigated. Diagrams and graphs.

10778* Bending and Buckling of an Elastically Restrained Circular Plate. H. Reismann. *Journal of Applied Mechanics*, v. 19 (*Transactions of the American Society of Mechanical Engineers*, v. 74), June 1952, p. 167-172.

The solutions given are based on the classical theory of plates and are exact within the assumptions underlying this theory. They include, as particular limiting cases, the known solutions for the simply supported and rigidly clamped edge.

10779* The Marcus Method Applied to Solution of Uniformly Loaded and Clamped Rectangular Plate Subjected to Forces in Its Plane. C. C. Chang and H. D. Conway. *Journal of Applied Mechanics*, v. 19 (*Transactions of the American Society of Mechanical Engineers*, v. 74), June 1952, p. 179-184.

10780* Lateral Vibrations as Related to Structural Stability. Harold Lurie. *Journal of Applied Mechanics*, v. 19 (*Transactions of the American Society of Mechanical Engineers*, v. 74), June 1952, p. 195-204.

A theoretical treatment of the above together with experimental tests. Latter were conducted on elastically restrained columns in the form of rigid rectangular frames. Rigid-joint trusses also were tested, and thin flat plates. Graphs, diagrams, and photographs. 14 ref.

10781* The Computation of Flexural-Torsional Buckling Loads. H. F. Michielsen. *Journal of Applied Mechanics*, v. 19 (*Transactions of the American Society of Mechanical Engineers*, v. 74), June 1952, p. 214-219.

Presents a simple and accurate method for the above.

10782* Torsional Vibration Modes of Tapered Bars. H. E. Fettis. *Journal of Applied Mechanics*, v. 19 (*Transactions of the American Society of Mechanical Engineers*, v. 74), June 1952, p. 220-222.

A solution for the differential equation which governs the above, these modes being simple harmonic functions of time.

10783* Analysis of Elastic Two and Three-Section Short Columns. C. M. Tyler, Jr., and F. Z. Lee. *Journal of Applied*

24. *Design*

Mechanics, v. 19 (*Transactions of the American Society of Mechanical Engineers*, v. 74), June 1952, p. 223-226.

Analytical formulas in terms of equivalent eccentricity are developed for above columns. Charts and table.

10784 Designing Leaf Springs for Precision Timing and Indexing Devices. George V. Nolde. *Machine Design*, v. 24, June 1952, p. 125-130.

Mathematical analysis of above. Also discussion of design factors such as free length of the cantilever leaf, material, extent of movement, and force to be exerted in terminal positions.

10785 Basic Design of Hydraulic Flow Regulators. H. G. Conway. *Machine Design*, v. 24, June 1952, p. 131-135.

In discussing the above the following are considered: restrictors; flow regulators; flow-control valves; and flow dividers. Numerous diagrams.

10786 Designing Cams. C. N. Neklutin. *Machine Design*, v. 24, June 1952, p. 143-160.

Describes method of design applicable to all types of cams requiring strict control of kinematic properties. Summarizes pertinent information on inertia and vibration phenomena in cam operation and presents detailed procedure for limiting their destructive effects. Numerous detailed tables and diagrams.

10787 Designing With Ductile Iron. John L. Goheen. *Machine Design*, v. 24, June 1952, p. 161-166.

Survey of the characteristics of ductile iron with pertinent information on important design considerations. Foundry practice is described. Charts, photographs, photomicrographs, and a table of mechanical, physical, and machinability properties.

10788 Electromechanical Brakes: Their Characteristics and Selection in Accordance With Duty Requirements. Robert C. May. *Machine Design*, v. 24, June 1952, p. 168-172.

Discusses electrical and mechanical characteristics of the various brakes ordinarily used. Factors that should be considered in selecting a brake are outlined. Photographs and circuit diagrams.

10789 Helical Spring Design. N. Sag. *Machine Design*, v. 24, July 1952, p. 153-156.

Data sheet giving simplified method groups variables for convenient chart solution with circular and rectangular section wire.

10790* Reduction of Development Costs in Die Casting. H. K. Barton. *Machinery* (London), v. 80, May 29, 1952, p. 942-950.

Comprehensive discussion of recommended procedures. Includes list of questions to be checked, and diagrams.

10791* The Trial and Development of Die Casting Dies. H. K. Barton. *Machinery* (London), v. 80, June 26, 1952, p. 1124-1132.

Covers general development procedure; disposition of vents; local venting requirements; alterations to gates; control of cavity temperature; use of remote gates and blind runners; and establishing production time.

10792 High Temperature Fastening Problem Solved With Special Self-Locking Nuts. Charles F. Faroni. *Materials & Methods*, v. 35, June 1952, p. 109-111.

Shows how proper materials selection and new design resulted in fasteners that can withstand vibration at temperature to 1200°F. On the basis of all-around performance, a 18-10 Cr-Ni stainless steel (Cb-stabilized and Se-modified) was selected. Tendency to "cold-weld" was overcome by use of Ag plate, which acts as a lubricant. Specific use is in a turbojet engine.

10793 Equivalent Dynamical Systems for Complex Vibration Problems. Walter W. Soroka. *Product Engineering*, v. 23, July 1952, p. 130-133.

10794 Significance of Separation in Hydrodynamic Design. C. C. Perry. *Product Engineering*, v. 23, July 1952, p. 152-157.

Topics discussed include: causes of separation and its effects in fluids that flow at a high velocity; methods for detecting and reducing separation in flow systems; importance of streamlining in avoiding turbulence and the effectiveness of guide vanes in reducing losses at pipe bends; ideal and real flow in conduits; and techniques for controlling and moving the boundary layer downstream to reduce pressure drag. Diagrams.

10795 Quality Control Methods—Their Use in Design. Part I. What is SQC? Dorian Shainin. *Machine Design*, v. 24, July 1952, p. 102-108.

Describes statistical quality control, a logical set of methods designed for application to the processing problems of any industry. Covers both general aspects and areas of special significance to machine designers. Numerous graphs.

10796* The Slo-Mo-Shun Gear and the Influence of Modern Gear Technology on its Performance Characteristics. M. L. Headman and P. E. Forsythe. *Western Machinery and Steel World*, v. 43, June 1952, p. 88-93.

Describes development of above at Western Gear Works, Seattle, as a design problem in high-speed gearing. The bearing problem is discussed. Photographs and diagrams.

10797* Bending of a Thin Elliptic Plate of an Orthotropic Material Under Uniform Lateral Load. (English.) Yosio Ohasi. *Zeitschrift für angewandte Mathematik und Physik*, v. 3, May 15, 1952, p. 212-224.

Mathematical analysis.

Miscellaneous Publications

10798 A Study of Combined Bending and Axial Load in Reinforced Concrete Members. Eivind Hognestad. Engineering Experiment Station, University of Illinois, Bulletin Series 399, Nov. 1951, 128 pages. (*University of Illinois Bulletin*, v. 49, no. 22.) (T1 I6b)

Methods and results of an experimental and analytical investigation. An inelastic flexural theory was developed, by means of which behavior of the test columns may be explained and measured ultimate loads predicted with satisfactory accuracy.

Books

10799 Advanced Strength of Materials. D. A. R. Clark. 342 pages. 1951. Blackie & Son, Ltd., London. (TA405 C54a)

An advanced text.

10800 Exhaust Hoods. Ed. 2. J. M. Dalla Valle. 146 pages, 1952. Industrial Press, New York. (TP960 D1ye2)

How air flows into various types of hoods and slots, with full instructions and data on procedures for proper design of hoods for removing dust, fumes, vapors, and gases. The final chapter is devoted to the complete calculations for 5 actual designs.

10801 Gears: Spur, Helical, Bevel and Worm. P. S. Houghton. 391 pages. 1952. Technical Press, Ltd., London. (TJ184 H81g)

A treatise for draftsmen, shop superintendents, foremen, mechanics, and students. Diagrams, illustrations, and calculations.

10802 Structural Design in Metals. Clifford D. Williams. 596 pages. 1949. Ronald Press Co., New York (TA684 W67s)

Throughout this text, emphasis is placed on design of details rather than on the complete structure. It is assumed that the usual prerequisites of strength of materials, applied mechanics, and the statics of structures have been mastered. An attempt is made to analyze both welded and riveted details in each phase of work. Includes chapters specifically on welding and riveting and one on light-gage structural members.

10803 Textile Machinery. H. Charlesworth and Associates. 152 pages. May 1947. British Intelligence Objectives Sub-Committee. (Reproduced by Mapleton House, Brooklyn.) (TS1525 T31)

14 separate reports on German textile machinery and its operation.

10804 Piping Design and Engineering. Ed. 1. 223 pages. 1951. Grinnell Co., Providence, R. I. (TS280 G88p)

Engineering data and technical information on design and application of pressure-piping systems. Numerous graphs, tables, and diagrams.

See also:
10310 (circular holes vs. tensile strength of Mg sheet)
11579 (design for wood construction)

25. CHEMICAL TECHNOLOGY

10805* Organic Complexing Agents in Textile Processing. John J. Singer and Frederick C. Bersworth. *American Dyestuff Reporter,* v. 41, June 9, 1952, p. P365-P369; disc., p. P369-P370.

Describes briefly the chemistry involved when metallic ions react with organic complexing agents. Discusses usage of Versene complexing agents including the following textile-industry processes: scouring; kier boiling; mercerizing; bleaching; and dyeing.

10806* Flushed Colors in Printing Inks. Henry N. Steuber. *American Ink Maker,* v. 30, June 1952, p. 52-53, 55, 57.

Flushing may be described as the transfer of a pigment from the water phase to the oil phase without the intermediate steps of drying and grinding. This occurs most readily when the pigment has a much greater tendency to be wet by the oil than by water. Describes the process, characteristics of flushed colors, applications, advantages, and future prospects.

10807* Synthetic Resins Up-To-Date. Werner Husen. *American Ink Maker,* v. 30, June 1952, p. 63-65, 67, 69-71, 73.

A list of 300 synthetic resins used in the manufacture of inks by type, name, manufacturer, and inks for which the resins are recommended.

10808 Coal Hydrogenation Process Unlocks Vast Aromatics Field. John R. Callaham. *Chemical Engineering,* v. 59, June 1952, p. 152-158.

Describes above process of Carbide & Carbon Chemicals Co., and the pilot plant at Institute, W. Va., on stream for 3 months and treating 300 tons of coal daily. Flowsheets and photographs.

10809 Coal Hydrogenation—More Cost Data. *Chemical Engineering,* v. 59, June 1952, p. 159-161.

Discusses recent extensive report made by Ebasco Services, Inc., N. Y., for the Bureau of Mines. Tables.

10810 Throw-Away Filter Medium. Francis O'Shaughnessy. *Chemical Engineering,* v. 59, June 1952, p. 169-171.

An evaluation of neoprene-tested filter paper giving data on cost, chemical resistance, and other properties. It can replace cotton duck in many services, or may be used with duck. Chart.

10811 Controlling Separation in Liquid-Solid Cyclones. E. B. Fitch and E. C. Johnson. *Chemical Engineering,* v. 59, June 1952, p. 172-173, 203.

Discusses important variables concerned in the above. Tables and diagram.

10812 Parlaying Profits From Process Data. *Chemical Engineering,* v. 59, June 1952, p. 174-176.

Describes and illustrates innovations at Celanese's new Edmonton, Alta., plant. They include: sieve trays for distillation and extraction; thermo-siphon reboilers; standardization of pumps; and air-cooled exchangers.

10813 What's Ahead for Nitric Acid. E. D. Crittenden. *Chemical Engineering,* v. 59, June 1952, p. 177-179, 286.

Explores technology and economics of HNO_3 in the fertilizer industry with accent on the future. Special attention is given to comparison of processes for nitric acidulation of phosphate rock.

10814 Liquid-Liquid Extraction. R. L. Von Berg and H. F. Wiegandt. *Chemical Engineering,* v. 59, June 1952, p. 189-200.

A report to bring the non-specialist reader up to date on the above. Considers: where the process is used commercially; selection and performance of equipment; selection of extraction solvent; and comparison with other separation methods. Tables and flow and other diagrams.

10815 Quicker Way to Dry Coatings. *Chemical Engineering,* v. 59, June 1952, p. 249-250.

Describes the new Chem-Dry process of Meyercord Co., Chicago, which uses SCl_2 vapors for drying coatings of ink, paint, or varnish.

108156 Preparation of Crude Synthesis Gas From Hydrocarbons. H. A. Tuttle. *Chemical Engineering Progress* (Engineering Section), v. 48, June 1952, p. 272-275; disc., p. 275.

Develops economic reasons for using hydrocarbon gases as a source of material for ammonia-synthesis raw gas. Thermal cracking is discussed briefly; reaction rates are given, and limitations and disadvantages are pointed out. The catalytic process is discussed in more detail with stress on function and design of the main items of equipment. Correlation of these and other auxiliary equipment is explained and their relationship is shown by a flow diagram.

10817 The Arosorb Process. James I. Harper, John Lee Olsen, and Frank R. Shuman, Jr. *Chemical Engineering Progress* (Engineering Section), v. 48, June 1952, p. 276-280; disc., p. 280.

Short historical review is accompanied by a simplified flow sheet to give an overall concept of the process. Process variables and other chemical-engineering factors entering into design of an Arosorb unit are discussed. Underlying principles of commerical hydrocarbon separation by silica gel are presented, and factors involved in setting up a silica-gel case cycle for a typical feed stock are covered.

10818 The Role of Super-Refractories in the Chemical and Hydrocarbon Industries. A. A. Turner, H. M. Killmar, and R. W. Brown. *Chemical Engineering Progress* (Engineering Section), v. 48, June 1952, p. 281-287.

Super-Refractories embrace ceramic and self-bonded, kiln-fired products made from silicon carbide, fused alumina, and synthetic electric-furnace mullite, as well as electrically fused-cast refractories. Tables, graphs, and diagrams. 27 ref.

10819 Multicomponent Distillation. IV. Determination of Minimum Reflux. P. G. Murdoch and C. D. Holland. *Chemical Engineering Progress* (Engineering Section), v. 48, June 1952, p. 287-292.

Two alternate equations for minimum reflux ratio are shown. Constant molal reflux is assumed. Both equations are exact when volatility ratios are constant throughout the column. 15 ref.

10819a Thermodynamics of the Deacon Process. Charles W. Arnold and Kenneth A. Kobe. *Chemical Engineering Progress* (Engineering Section), v. 48, June 1952, p. 293-296.

New calculations are made for the thermodynamic properties of Cl_2 and HCl. These data are combined with those of the National Bureau of Standards to calculate equilibrium conversion and concentration of chlorine for the Deacon process. Use of industrial oxygen rather than air gives a small increased concentration of Cl_2 in the equilibrium gas. 43 ref.

10820 Continuous Extraction in a Multistage Mixer Column. J. Y. Oldshue and J. H. Rushton. *Chemical Engineering Progress* (Engineering Section), v. 48, June 1952, p. 297-306; disc., p. 306.

Performance data are presented for a continuous counter-current extraction column, composed of a 6-in.-diam. vertical glass tube, compartmented by horizontal plates, agitated by mixing impellers on a vertical shaft, and baffled by vertical members. Acetic acid was extracted from water to methyl-isobutyl ketone, and also from the ketone to water, in a countercurrent manner using the column with different-sized compartments, impellers, impeller positions, impeller speeds, acid concentrations, and feed rates. Tables, graphs, and diagrams. 18 ref.

10821 A Correlation of Solids Turnover in Fluidized Systems; Its Relation to Heat Transfer. Max Leva and Milton Grummer. *Chemical Engineering Progress* (Engineering Section), v. 48, June 1952, p. 307-313.

Vertical velocities of particles along the container wall were determined in fluidized-sand and silica-gel beds. Particle velocities were then correlated in terms of quantities readily observed and calculated for fluidized beds. The correlation led to definition of a new concept; "inter-particle" friction factor. Film coefficients of heat transfer between fluidized beds and the surroundings were analyzed. Survey of other published data showed a similarity between various methods of correlation.

25. *Chemical Technology*

10822* Organic Chemicals From Natural Gas. R. J. S. Jennings. *Chemical & Process Engineering*, v. 33, May 1952, p. 243-246; June 1952, p. 308-312.

May issue gives a general discussion of the manufacture of chemicals from natural gas, and deals in detail with the production of acetylene from methane. June issue gives in detail the production of acetone, methanol, formaldehyde, and acetaldehyde. Flow diagrams. 44 ref.

10823. Lignite Tar Oils of Central Germany. (German.) E. Gundermann. *Chemische Technik*, v. 4, Feb. 1952, p. 64-69.

Above are classified into six groups, namely benzenes, diesel oils, solvent oils, paraffin oils, phenols, and creosote oils. Their properties are discussed and tabulated.

10824* Solvent Power for Coals at Room Temperature; Chemical and Physical Factors. I. G. C. Dryden. *Chemistry & Industry*, June 7, 1952, p. 502-508.

Reviews literature and presents tabular data for a wide variety of organic solvents. Discusses characteristics of a good solvent, classifies the liquids according to solvent power, and deduces certain relationships between solvent power and other properties. 43 ref.

10825 In General Mills' Research Program—Accent is on Chemurgy. A. D. Hyde. *Chemurgic Digest*, v. 11, June 1952, p. 6-9.

Discusses the above, chiefly dealing with the work on polyamide resins; production of amines, amides, and nitriles from fatty acids and ammonia; and wheat starches and protein.

10826 Chemicals, Pipeline Gas and Liquid Fuels From Coal. W. C. Schroeder. *Combustion*, v. 23, June 1952, p. 54-62.

Reviews what has been accomplished toward production of synthetic liquid and gaseous fuels from coal to supplement those obtained from natural sources; also of use of coal as a raw material for industrial chemicals. Underground gasification, developments in hydrogenation, and the Fischer-Tropsch process are discussed both technologically and economically.

10827* Anthracite for Filtration. E. L. Streatfield. *Engineer*, v. 193, June 6, 1952, p. 771-774.

Describes and illustrates some English experience in the use of above. Gives tabular performance data.

10828* Solvent-Extraction Experiments and Their Utilization in Lubricant Refining. (German.) M. Freund and A. Vámos. *Erdöl und Kohle*, v. 5, May 1952, p. 283-290.

Proposes re-examination and correction of usual methods of interpretation of the results of solvent extraction on the basis of numerous experiments. Certain discrepancies between the actual products, and the graphic values obtained by conventional methods, are indicated. A more exact mode of calculation is proposed. Data are tabulated and charted. 21 ref.

10829* Progress in Gas Purification. H. Hollings. *Gas Journal*, v. 270, June 11, 1952, p. 696-699; disc., p. 699-700.

Discusses early attempts to prepare a purifier mass of artificial bog ore. Also describes recent experiments in gas purification. Flow diagrams.

10830 The Industrial Production of Ethylene Oxide. J. Plant. *Industrial Chemist and Chemical Manufacturer*, v. 28, June 1952, p. 259-264.

Describes production of ethylene oxide by the chlorhydrin process at the plant of Petrochemicals, Ltd., Urmston, Manchester, England.

10831 Cyclopentane and Neohexane in Petroleum. Robert F. Marschner and Donald E. Burney. *Industrial and Engineering Chemistry*, v. 44, June 1952, p. 1406-1408.

The close boiling points of cyclopentane and neohexane and occurrence of an azeotrope permit cyclopentane-neohexane mixtures to survive ordinary naphtha-distillation processes with negligible change in composition. Consequently, cyclopentane-neohexane can be used as a tracer for light naphthas from producing well to finished product, unless the naphtha is blended with streams of unknown composition. The technique of tracing by means of cyclopentane-neohexane has been employed successfully in determining probable sources of unfamiliar aviation gasolines and solvent naphthas and as a test mixture for comparing fractionating columns. 18 ref.

10832 Oxidation of Bituminous Coal to Organic Acids by Nitric Acid and Oxygen. T. R. Savich and H. C. Howard. *Industrial and Engineering Chemistry*, v. 44, June 1952, p. 1409-1411.

Oxidation of a Pocahontas No. 3 bituminous coal was studied over the range of 110-140°C., with HNO_3 concentrations up to 16 M. Changes in O_2 pressure from 400-600 psig. were found to have little effect on rate. For production of water-soluble polycarboxylic acids, this process is somewhat simpler than that using alkali and O_2. However, aromatic-acid content is higher in the latter.

10833 Gas-Solid Film Coefficients of Heat Transfer in Fluidized Coal Beds. J. S. Walton, R. L. Olson, and Octave Levenspiel. *Industrial and Engineering Chemistry*, v. 44, June 1952, p. 1474-1480.

Values of heat-transfer coefficients for gas to sized Utah coal particles in a fluidized bed were determined as an aid in predicting rates of heat transfer to be expected in similar systems. An equation representing the data is given. Statistical examination of effect of diameter of the particles.

10834 Extraction of Mercaptans From Light Distillate Fuels. R. L. Yahnke, J. H. Krause, and G. H. Weisemann. *Industrial and Engineering Chemistry*, v. 44, June 1952, p. 1486-1489.

Bench-scale and pilot-plant studies have led to a solvent-extraction process for removing malodorous mercaptans. The solvent is compound of aqueous KOH, CH_3OH, and potassium cresylates. Extraction is improved by low operating temperatures, use of concentrated aqueous KOH as a component of the solvent, and recycle of by-product cresylates.

10835 Vacuum Retorting of Oil Shale in a Fluidized Bed. John W. Pringle, Paul L. Barrick, and Henry F. Wigton. *Industrial and Engineering Chemistry*, v. 44, June 1952, p. 1489-1491.

Above was studied to determine effects of reduced pressure and to evaluate performance of a fluidized system under vacuum. The effect of pressure on temperature required to produce oil from the shale and character of the liquid products were studied in detail. The vacuum-retorting method is suggested for obtaining stable, uniform material from oil shale for cracking under controlled conditions for production of fuels and other petroleum-type products.

10836 Oil From Alberta Bitumen; Simultaneous Dehydration and Coking Using Fluidized Solids. G. W. Hodgson, Ben Matchen, W. S. Peterson, and P. E. Gishler. *Industrial and Engineering Chemistry*, v. 44, June 1952, p. 1492-1496.

Tables and diagrams.

10837 Formaldehyde From Methanol. Rodney N. Hader. *Industrial and Engineering Chemistry*, v. 44, July 1952, p. 1508-1518.

Discusses in detail the above chemical process. Numerous graphs, photographs and tables. Flow sheet for production of formaldehyde at Spencer Chemical Co., Calumet City, Ill. 23 ref.

10838 Phosphorus and Phosphates. The American Phosphorus Industry. Christian H. Aall. **Elemental Phosphorus and Phosphoric Acid in the Fertilizer Industry.** E. J. Fox and W. L. Hill. **Composition and Properties of Superphosphate.** H. L. Marshall and W. L. Hill. **Quick-Curing Superphosphate.** G. L. Bridger and Edwin C. Kapusta. *Industrial and Engineering Chemistry*, v. 44, July 1952, p. 1519-1546.

A symposium which treats the above in great detail. Numerous graphs, photographs, and tables. 98 ref.

10839 Copper 3-Phenylsalicylate; New Preservative for Special Applications to Wood. Fred. J. Meyer and Ralph M. Gooch. *Industrial and Engineering Chemistry*, v. 44, July 1952, p. 1586-1589.

Describes the above preservative, designed especially for use on wood that is in contact with seeds and plants, food (particularly fruits and vegetables), and others. Photographs and tables.

10840 Characterization of Petroleum Residuums by Vacuum Flashing. Paul H. Johnson and K. L. Mills, Jr. *Industrial and Engineering Chemistry*, v. 44, July 1952, p. 1624-1629.

Vacuum flash vaporization was used to separate high-boiling gas-oil and asphalt fractions from various crudes for the purpose of making a closer examination of these materials and to ascertain the best and most economical disposition of them. Testing equipment is described and diagrammed; results are discussed. Numerous graphs and tables.

10841 Adsorption in the Detergent Process. Arthur L. Meader, Jr., and Bernard A. Fries. *Industrial and Engineering Chemistry*, v. 44, July 1952, p. 1636-1648.

Describes an attempt to evaluate more fully the rolé of the above. The adsorption of sodium alkyl aryl sulfonate and sodium palmitate on cotton and woolen cloth was measured under widely varying conditions and compared with detergency obtained under similar conditions. Experimental procedures and results are discussed. Numerous graphs. 37 ref.

10842 Alkali Lignin to Stabilize Slow-Break Asphalt Emulsions. W. A. McIntosh. *Industrial and Engineering Chemistry*, v. 44, July 1952, p. 1656-1659.

17 asphalts from widely differing crudes were emulsified, using alkali lignin as the stabilizer. Formulas and test results as well as some asphalt properties and crude sources are given as a guide to further emulsification studies. Tables.

10843 Phenols by Dehydrogenation. H. C. Chitwood, J. T. Fitzpatrick, G. W. Fowler, and B. T. Freure. *Industrial and Engineering Chemistry*, v. 44, July 1952, p. 1696-1698.

The catalytic dehydrogenation of cyclohexanol and cyclohexanone was studied. The most satisfactory catalysts found were made from Ni, Cu, Cr, and alkali metal sulfate, supported on an inert carrier. With these catalysts at 350°C., phenol yields better than 95% were maintained during operating periods of well over 100 hrs. Tables. 15 ref.

10844 Effect of Intraparticle Diffusion. Agitated Nonflow Adsorption Systems. Fred J. Edeskuty and Neal R. Amundson. **Analytical Solution for Simple Systems in Moving Bed Adsorbers.** Paul R. Kasten and Neal R. Amundson. *Industrial and Engineering Chemistry*, v. 44, July 1952, p. 1698-1711.

Purpose of investigation was to determine the effect of intraparticle diffusion in moving-bed adsorption systems, with the idea of placing the design of such adsorbers on a rational basis and to investigate one of the possible rate-determining steps in the adsorption of a solute from a solution. Results are summarized. Numerous tables and graphs. 45 ref.

10845 Hydrolysis of Woods Using Dilute Sulfuric Acid. *Industrial and Engineering Chemistry*, v. 44, July 1952, p. 1712-1720.

Hydrolysis of mixed hardwood chips to sugars and the concentration of resultant sugar solutions to molasses for animal feeding were investigated by operation of a pilot plant. Plant equipment is described and results discussed. Tables and diagrams. 20 ref.

10846 Cream by the Slice. *Industrial and Engineering Chemistry*, v. 44, June 1952, p. 17A-18A, 20A.

Equipment developed by Mrs. Norma Gallenkamp, Houston, Tex., which produces emulsions or suspensions by action of a cluster of razor blades on a spindle revolving at 7000 rpm. Several products, including various creams and lotions, have been produced. Chemical-engineering potentialities should be great.

10847 Completely Automatic Control System for the Distillation Process. I. Lefkowitz. *Instruments*, v. 25, June 1952, p. 773-777; *I.S.A. Journal*, v. 8, June 1952, p. 67-71.

Describes system developed by Joseph E. Seagram & Sons, Louisville, for liquor distillation, but applicable to distillation problems in general. Diagrams.

10848* Classification of Bitumens in Asphalt Technology by Certain Rheological Properties. Part III. The Practical Value of Viscosity Number and Related Indices as Compared With Other Established Methods of Bitumen Characterization. S. L. Neppe. *Journal of the Institute of Petroleum*, v. 38, May 1952, p. 344-360.

Includes graphs.

10849* The Deterioriation of Transformer Oil. Part III. Assessment and Improvement of Oil Stability. L. Massey. *Journal of the Institute of Petroleum*, v. 38, May 1952, p. 361-393.

Difficulties encountered in the transformer-oil oxidation test specified in BS-148 are described in detail, and results of varying the conditions of test are shown in a series of graphs and tables. Results of an attempt to correlate iodine values of oils with their oxidation products are given. Need for oils of improved stability is discussed. Catalytic power exerted by varying concentrations of different forms of Cu was studied. Tests are reported which prove that some varnish films baked on Cu test panels permit migration of Cu through the varnish film to oil surrounding the panel.

10850* Inhibited Transformer Oil. W. R. Stoker, C. N. Thompson. *Institution of Electrical Engineers*, v. 99, pt. 2, June 1952, p. 221-230; disc., p. 238-244.

Description of some results obtained in the laboratory in trials with small transformers under laboratory conditions and with transformers in service. Questions which arise from the use of inhibited oils are discussed. 16 ref.

10851* The Stability of Oil in Transformers. P. W. L. Gossling and L. H. Welch. *Institution of Electrical Engineers*, v. 99, pt. 2, June 1952, p. 231-238, disc., 238-244.

Summarizes operating experience with transformer oils from the aspect of sludge formation and the increase of acidity with life. Describes tests designed to study the correlation of increasing acidity found in service with predictions of performance based upon the Michie sludge test. Acidity values are discussed from the aspect of working conditions and transformer site. Numerous tables and graphs.

10852 Studies in Coal-Tar Bases. V. Contaminants of Pyridine. E. A. Coulson and J. B. Ditcham. *Journal of Applied Chemistry*, v. 2, May 1952, p. 236-238.

Commercial samples of pyridine derived from coal tar show a variability in the ease with which they are catalytically hydrogenated. This variability can be correlated with the amount of sulfur-containing impurities.

10853 The Influence of Soap-Phase Structure on Some Physical Properties of Lithium Greases. D. Evans, J. F. Hutton, and J. B. Matthews. *Journal of Applied Chemistry*, v. 2, May 1952, p. 252-262.

A calorimeter and technique for the differential thermal analysis of soap-oil systems such as greases, are described. Results are given for the temperatures and latent heats of phase transformation which occur in grease systems made from Li stearate, Li-12-hydroxystearate, or mixtures of these two soaps, and a hydrocarbon lubricating oil. Graphs, photomicrographs, and tables. 22 ref.

10854 An Investigation of the Gaseous Thermal-Decomposition Products of Linseed Oil. J. M. Horspool, K. A. R. Julian, and Graham Oldham. *Journal of Applied Chemistry*, v. 2, May 1952, p. 283-287.

Describes method developed for investigation of the above products of linseed oil when used as core binders. The method is suitable for similar investigations on other core-binding materials. Products of decomposition between 400-800°C. were investigated as well as effect of preliminary heat treatment of the core on composition of the gas. Tables and graphs.

10855* New Method for Measuring Mechanical Properties of Fabrics and Fibers. (Russian.) V. A. Pchelin. *Legkaia Promyshlennost*, v. 12, Jan. 1952, p. 37-38.

The torsion pendulum was used for the above. Method and equipment are described.

10856* The Practical Possibilities of Ion Exchange. (Concluded.) Part 4. New Processes and Materials. T. R. E. Kressman. *Manufacturing Chemist and Manufacturing Perfumer*, v. 23, June 1952, p. 241-243.

Discusses mixed-bed demineralization and new ion-exchange resins such as the sulfonated polystyrenes. Lists ion-exchange materials produced by different manufacturers.

25. *Chemical Technology*

10857* Production of High-Purity Aromatics—for Chemicals. Davis Read. *Oil and Gas Journal*, v. 51, June 23, 1952, p. 82, 85-86, 88-89.

Tells how new petrochemical processes now manufacture chemical "building stones", formerly produced only from coal tar. Tables, graphs, and flow diagrams.

10858* New SO_2 Aromatic Extraction Unit Being Installed by Conoco at Lake Charles. F. Lawrence Resen. *Oil and Gas Journal*, v. 51, June 16, 1952, p. 313-314, 316.

Describes above versatile installation which can easily be shifted into defense production of aromatics or peace-time refining of distillates. Flow diagram and photographs.

10859* Impregnating and Coating of Specialty Papers. *Paper Trade Journal*, v. 134, June 27, 1952, p. 83-84, 86.

Equipment and procedures. Illustrated.

10860 Petrochemicals From Water Gas. Part 3. (Concluded.) Peter W. Sherwood. *Petroleum Engineer*, v. 24, July 1952, p. C13-C14, C16-C18.

Describes process in which water gas figures prominently—the hydrogenation of coals and heavy oils for the manufacture of gasoline, fuel oils, and specialty products. Process is an extension of standard cracking processes, designed to overcome the latters' inherent yield limitations. It is particularly useful for upgrading carbonaceous fuels of low H/C ratio. 13 ref.

10861 The Autofining Process. *Petroleum Engineer*, v. 24, July 1952, p. C31-C32.

Describes new catalytic desulfurization process developed by Anglo-Iranian Co. which operates at pressures of 50-200 psig. and 700-800F. and makes use of a very stable sulfur-resistant catalyst having a long life. Tables.

10862 Petrochemicals in TEL Manufacture. David P. Thornton, Jr. *Petroleum Processing*, v. 7, June 1952, p. 846-848.

Gives details of new Houston, Tex., plant of Ethyl Corp.

10863 Bench Scale Cracking Unit Reproduces Plant Conditions. C. W. Rackley and C. W. Shelley. *Petroleum Refiner*, v. 31, June 1952, p. 89-92.

Small fixed-bed cracking unit employs granular catalyst and is suitable for both research and plant-control work. Catalysts and oils may be evaluated at practically all processing conditions except for internal recycle.

10864 Evaluation of Radiant Heat Absorption Rates in Tubular Heaters. Part I. Radiation From Primary Sources. L. A. Mekler and R. S. Fairall. *Petroleum Refiner*, v. 31, June 1952, p. 101-107.

Graphical approach provides furnace designer with short but accurate method of solving the radiation equations. (To be continued.)

10865 How to Prepare Preliminary Cost Evaluation Reports. Peter W. Sherwood. *Petroleum Refiner*, v. 31, June 1952, p. 126-130.

"Quick evaluation" procedure to help chemical engineers in making reports upon which management depends for decisions regarding expansion.

19866 The Solution of Multicomponent Phase Equilibria Problems. Charles L. Wilson. *Petroleum Refiner*, v. 31, June 1952, p. 131-138.

New techniques developed for simplifying calculations of bubble points, dew points, and flash vaporization. 16 ref.

10867 Lube Oil Acid Treatment Developed For Italian Refineries. F. Sager and F. Palmqvist. *Petroleum Refiner*, v. 31, June 1952, p. 139-143.

Two-stage, centrifugal process said to offer advantage of higher yield and reduction in chemical consumption over the single-stage. Tables and graphs.

10868* Atomic Pile Chemistry. John F. Flagg and Edwin L. Zebroski. *Scientific American*, v. 187, July 1952, p. 62-67.

Discusses chemical and chemical engineering problems—particularly, reclamation of partly-used fuel—involved in operation of a nuclear power plant. Diagrams.

10869* Application of Statistical Methods in the Coating Plant. R. T. Trelfa. *Tappi*, v. 35, June 1952, p. 254-257.

Application of statistical methods to problems of routine control and to specific investigations is discussed. Actual problems in the paper-coating plant solved by statistical methods illustrate the scope and value of these techniques.

10870* Electrochemical Recovery of Sodium Base and of Oxalic Acid From Sulphite Waste Liquor. K. C. Logan and C. B. Purves. *Tappi*, v. 35, June 1952, p. 284-288.

Describes laboratory-scale experiments in which over 90% of the sodium was recovered, as nearly pure caustic soda of up to 2% concentration, by electrolyzing the waste liquor in a cell with a porous clay diaphragm and a Ni cathode. The oxidation of purified, carbohydrate-free Na lignosulfonate was studied under strongly alkaline conditions in a cell with a Cu anode and no diaphragm. Part of the sulfonic acid group was released as H_2SO_4, but oxalic acid dihydrate in up to 16% by weight was the only other acid identified. Tables. 24 ref.

10871* Cellulose Studies. Part XVII. The Heterogeneous Acid Degradation of Cellulose. Part XVIII. The Homogeneous Degradation of Cellulose in Phosphoric Acid. Frederick W. Bauer and Eugene Pacsu. *Textile Research Journal*, v. 22, June 1952, p. 385-404.

Part XVII discusses the two schools of thought that have arisen in interpreting the results of the above process. A series of experiments was carried out to gain insight into the actual mechanism of the reaction. In Part XVIII, the concept of molecular dispersion of cellulose and cellulose derivatives in various solvents is amplified. The most recent studies on the homogeneous H_3PO_4 degradation were on cotton, Mitscherlich pulp, and semichemical aspen pulp. Rate constants for hydrolysis in approximately 81% H_3PO_4 at 25°C. were determined. 58 ref.

10872* Formation of Cellulose Ethers in Water-Repellency Treatment of Cotton With Stearamidomethylpyridinium Chloride. H. A. Schuyten, J. W. Weaver, J. G. Frick, Jr., and J. David Reid. *Textile Research Journal*, v. 22, June 1952, p. 424-432.

Discusses the permanent water-repellency obtained in treatment of cotton fabrics with amidomethylpyridinium salts. These are said to import the repellency by chemical reaction with cellulose. Tables and graphs. 24 ref.

Miscellaneous Publications

10873 Separation and Utilization Studies of Bitumens From Bituminous Sandstones of the Vernal and Sunnyside, Utah, Deposits. Part I. Laboratory Hot-Water Separation Tests. G. D. Shea and R. V. Higgins. **Part II. Analytical Data on Asphalt Properties and Cracked Products of the Separated Bitumens.** W. J. Wenger, R. L. Hubbard, and M. L. Whisman. U. S. Bureau of Mines, Report of Investigations 4871, May 1952, 28 pages. (TN21 Un3r)

10874 Report of Committee D-2 on Petroleum Products and Lubricants. American Society For Testing Materials, Preprint 31, 1952, 80 pages. (TA401 Am35p)

Recommended revisions in test methods, standards, and specifications. Includes method of analysis of Ca and Ba petroleum sulfonates, test for mercaptan S in jet fuels, analysis of oil-soluble petroleum sulfonates, reduced-pressure distillation of petroleum products, for gum in fuels by jet evaporation, for specific gravity, and for neutralization value.

10875 Report of Committee D-4 on Road and Paving Materials. American Society For Testing Materials, Preprint 33, 1952, 42 pages. (TA401 Am35p)

Recommended revisions in standards and specifications. Cooperative test data on road-oil samples. Stripping test for bitumen-aggregate mixtures. Sampling of bituminous materials. Specific-gravity tests on road oils, tars, asphalt cements, pitches, etc. Distillation test procedure.

10876 Report of Committee D-6 on Paper and Paper Products. American Society For Testing Materials, Preprint 35, 1952, 27 pages. (TA401 Am35p)

Proposed tentative test procedures for pinholes in grease-

proof papers, for Zn and Cd in paper, for contrast gloss, for specular gloss, for flat crush of corrugated paperboard, for ply adhesion, and for water resistance.

10877 Report of Committee D-7 on Wood. American Society For Testing Materials, Preprint 36, 1952, 105 pages. (TA401 Am35p)

New and revised specifications, test methods, and standards. Includes veneer or plywood tests and fiber-board tests.

10878 Report of Committee D-8 on Bituminous Waterproofing and Roofing Materials. American Society For Testing Materials, Preprint 37, 1952, 18 pages. (TA401 Am35p)

New and revised test methods, standards, and specifications. Includes method for sampling bituminous materials.

10879 Report of Committee D-12 on Soaps and Other Detergents. American Society For Testing Materials, Preprint 41, 1952, 16 pages. (TA401 Am35p)

Recommended revisions of specifications, standards, and test methods. Includes surface and interfacial-tension determinations, and tests on metal-cleaning agents.

10880 Report of Committee D-13 on Textile Materials. American Society For Testing Materials, Preprint 42, 1952, 75 pages. (TA401 Am35p)

New and revised test methods, specifications, and standards. Includes definitions of terms, flammability test, Cu and Mn in textiles, light fastness, etc.

10881 Report of Committee D-17 on Naval Stores. American Society For Testing Materials, Preprint 46, 1952, 10 pages. (TA401 Am35p)

Includes proposed specifications for dipentene, pine oil, and rosin.

10882 Conditioning and Weathering of Paper. William R. Willets. American Society For Testing Materials, Preprint 117, 1952, 6 pages. (TA401 Am35p)

Examples are given showing the importance of relative humidity in testing, specification, converting, and end use. Other conditioning and weathering factors are discussed.

10883 Progressive Heterogeneity in Aged "Negative Spot-Test" Naphtha Sols. G. L. Oliensis. *American Society For Testing Materials, Proceedings*, v. 51, 1951, p. 1251-1260; disc., p. 1260-1261. (TA401 Am35p)

In 1941, it was found that the more homogeneous the internal structure of an asphalt was, the longer would be its "negative period" (the time required for its spot-test sol to turn positive), and the latter value was reported for 18 of the 39 asphalts studied whose end point had by then been reached. Since then, 15 of the remaining 21 asphalts have attained this end point. Presents tabulation of all negative-period values obtained to date, a 10-yr. comparison between "negative period" and "hexane resistance" values, a study of the comparative effectiveness of commercial hexane and pure normal hexane for determination of "hexane resistance;" and bearing of the data on character of the flocculated bodies.

Books

10884 Pulp and Paper. Vol. II. Properties of Paper and Converting. James P. Casey. 1405 pages. 1952. Interscience Publishers, Inc., New York. (TS1105 C26p)

A comprehensive treatise covering properties of paper; use of statistics in the paper industry; pigment coating; printing; laminating and pasting; internal treatment of paper with resinous materials; coating with resinous materials; and resins. Numerous footnote references.

10885 Das Holzöl. (Tung Oil.) Ewald Fonrobert. 552 pages. 1951. Berliner Union, Stuttgart, Germany. (TP684.W6 F73h)

Comprehensive treatise covering growth of the tung tree, method of extraction, physical and chemical properties, uses in maufacture of organic coatings, soaps, and other products. Extensive bibliographies.

10886 The Manufacture of Intermediates and Dyes; An Introduction to Work Practice. G. H. Frank. 177 pages. 1952. Chemical Publishing Co., New York. (TP913 F85m)

Starts with isolation of pure compounds from crude benzol from coke-oven plants, goes on to the manufacture of intermediates, and gives examples of the manufacture of dyes. Such major operations as nitration, reduction, sulfonation, caustic-soda fusions, amidation, distillation, vacuum distillation, and separation are described in some detail. General descriptions of the plant are given, together with particular descriptions for specific examples.

10887 Organische und Anorganische Wasch-, Bleich- und Reinigungsmittel. (Organic and Inorganic Washing, Bleaching, and Cleaning Agents.) C. Lüttgen. 365 pages. 1952. Strassenbau, Chemie und Technik Verlagsgesellschaft m.b.H., Heidelberg, Germany. (TP990 L960)

Brief discussion of cleaning action of most important agents is followed by brief descriptions of numerous patents on above subject.

10888 Composition and Properties of Oil Well Drilling Fluids. Ed. 1. Walter F. Rogers. 525 pages. 1948. Gulf Publishing Co., Houston, Tex. (TN871 R63c)

A comprehensive description of the above, designed to meet the needs of those who prepare and use them. Includes abstracts of the patent literature, 24-page bibliography, author and subject index.

10889 Chemical Engineering Operations; An Introduction to the Study of Chemical Plant. Frank Rumford. 376 pages. 1952. Chemical Publishing Co., New York. (TP155 R86c)

Designed as a textbook for student use, not as a comprehensive treatise. 17 chapters each cover a specific unit operation. Diagrams, graphs, and worked examples.

See also:
10342 (corrosion from industrial chemicals)
10539 (electron-microscope studies of fibers)
10818 ("Super-Refractories" in the chemical industry)
11072 (determing properties of tars and bitumens)
11121 (polyvinyl-butyral-coated fabrics)
11139 (natural-rubber latex applied to paper, leather, etc)
11147 (water-vapor-permeable rubberized fabrics)
11251a (textbook of economic botany)
11579 (wood as a structural material)

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10890 The Cu_2O-SiO_2 System and the Existence of Anhydrous Copper Silicates. (Russian.) A. S. Berezhnoi, L. I. Kariakin, and I. E. Dudavskii. *Doklady Akademii Nauk SSSR*, new ser., v. 83, Mar. 21, 1952, p. 399-401.

Data tabulated, charted, and discussed.

10891 Complex Halides of Phosphorus Formed by PCl_5 and PBr_5 With the Halides of Iodine. (Russian.) I. D. Muzyka and Ia. A. Fialkov. *Doklady Akademii Nauk SSSR*, new ser., v. 83, Mar. 21, 1952, p. 415-417.

Experiments were made on the formation of the above complexes. Data are tabulated.

10892 Solubility of Liquid Ammonia in Compressed Nitrogen at Pressures Up to 4000 Atmospheres. (Russian.) D. S. Tsiklis. *Doklady Akademii Nauk SSSR*, new ser., v. 83, Apr. 1, 1952, p. 585-588.

Data are charted. 12 ref.

10893 Hysteresis During the Impregnation of Porous Materials With Mercury. (Russian.) N. M. Kamakin and A. V. Kiselev. *Doklady Akademii Nauk SSSR*, new ser., v. 83, Apr. 1, 1952, p. 589-592.

Tests were made on evaluation of the porosity of silica-gels and similar materials by use of mercury. Data are charted.

10894 Chain Mechanism of the Decomposition of H_2O_2; Existence of the HO_2 Radical and A. N. Bakh's Higher Hydrogen Peroxide. (Russian.) K. E. Krugliakova and N. M. Emanuel. *Doklady Akademii Nauk SSSR*, new ser., v. 83, Apr. 1, 1952, p. 593-596.

10895 Geometrical Conversion in a Series of Mutual Systems of Halides and Carbonates of Sodium and Potas-

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isum. (Russian.) R. N. Niankovskaia. *Doklady Akademii Nauk SSSR*, new ser., v. 83, Mar. 21, 1952, p. 419-422.

Presents a theoretical discussion of the above. Experimental data are charted.

10896* Dispersion of Skeletal Nickel Catalysts. (Russian.) L. M. Kefeli and N. G. Sevast'ianov. *Doklady Akademii Nauk SSSR*, new ser., v. 83, Apr. 21, 1952, p. 863-864.

X-ray diffraction was used to study the grain size of the nickel after various conditions of production. Data are tabulated.

10897* The Probability of the Formation of Crystal Nuclei in Binary Compounds of the Eutectic Type. (Russian.) Ia. V. Grechnyi. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 1, 1952, p. 89-92.

Melts of camphor with benzoic acid, napthalene, o-chlornitrobenzene, and p-dibromobenzene were used in the study of the above. Data are charted.

10898* Ways of Controlling the Structure of Activated Carbon Made From Sugar. (Russian.) M. M. Dubinin and E. D. Zaverina. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 1, 1952, p. 93-96.

Experiments on the above were made by carbonizing the sugar with various additions of salts. Data are tabulated and charted.

10899* The Structure of Skeletal Catalysts. (Russian.) L. M. Kefeli and S. L. Lel'chuk. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 11, 1952, p. 285-288.

Cu and Ni skeleton-type catalysts were examined by x-ray diffraction. Data are tabulated and discussed. 12 ref.

10900* The Kinetics of the Formation of Dicalcium Silicates. (Russian.) N. A. Toropov, A. M. Ginstling, and G. Luginina. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 11, 1952, p. 293-295.

The above was studied for the reaction between $CaCO_3$ and SiO_2 at 1350°C. 10 ref.

10901* The Porous Structure of Activated Carbon. (Russian.) V. A. Aleksandrov, M. M. Dubinin, E. D. Zaverina, T. G. Plachenov, and S. G. Chepurnoi. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 11, 1952, p. 301-304.

A laboratory study was made on the distribution of pore sizes in activated carbon. Tables and graphs.

10902* Metasilicate Chains and the Theory of Heat Capacity. (Russian.) V. V. Tarasov. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 11, 1952, p. 321-324.

Previously published data are used to develop equations for the heat capacity of such materials. Tables and graphs. 10 ref.

10903* A Note on the Melting Point of Titanium Dioxide. P. D. S. St. Pierre. *Journal of the American Ceramic Society*, v. 35, July 1952, p. 188.

A new determination indicates that the melting point of pure TiO_2 is 1840 ± 10°C. Apparatus diagram.

10904 Polarographic Reduction of Iodonium Salts. Eugene L. Colichman and Hector P. Maffei. *Journal of the American Chemical Society*, v. 74, June 5, 1952, p. 2744-2748.

Polarographic reduction at the dropping mercury cathode of both symmetrically and unsymmetrically substituted iodonium salts was noted and reported. A mechanism for the 3-step reduction is proposed in agreement with experimentally found and derived polarographic data. Effect of buffering, acidity, solvents, and concentration are reported and an analytical scheme for determining iodonium salts quantitatively is outlined.

10905 The Iodine—Iodide Interaction. Mansel Davies and Emrys Gwynne. *Journal of the American Chemical Society*, v. 74, June 5, 1952, p. 2748-2752.

Equilibria in dilute aqueous iodide-iodine solutions were reexamined systematically at a number of temperatures by the partition technique. 24 ref.

10906 The Reaction of Beryllium Oxide With Water Vapor. Leonard I. Grossweiner and Ralph L. Seifert. *Journal of the American Chemical Society*, v. 74, June 5, 1952, p. 2701-2704.

10907 Thermal Data, Vapor Pressure and Entropy of Bromine Trifluoride. George D. Oliver and J. W. Grisard. *Journal of the American Chemical Society*, v. 74, June 5, 1952, p. 2705-2707.

10908 The Mechanism of the Reaction Between Glycerol and Hydriodic Acid. R. B. Bradbury. *Journal of the American Chemical Society*, v. 74, June 5, 1952, p. 2709-2712.

Above reaction to give isopropyl iodide as the final product was studied kinetically by determining rates of formation of iodine. 15 ref.

10909 The Viscosity of Gaseous Uranium Hexafluoride. Albert L. Myerson and John H. Eicher. *Journal of the American Chemical Society*, v. 74, June 5, 1952, p. 2758-2761.

A series of experiments was undertaken to investigate the reason for the large (10-20%) discrepancies between values reported by the Manhattan Project and corresponding workers in Great Britain. Accurate values are reported in the range 40-200°C. 11 ref.

10910* Catalytic Surfaces and the Hydrolysis of Diethyl Carbonate. R. W. Sauer and K. A. Krieger. *Journal of the American Chemical Society*, v. 74, June 20, 1952, p. 3116-3120.

Heterogeneous catalysis of hydrolysis of diethyl carbonate was studied as a diagnostic method for characterization of solid surfaces. The kinetics of the reaction, however, did not prove to be a measure of surface basicity as anticipated from its marked specificity toward basic catalysis in solution. Ability of a solid to catalyze the reaction appeared to be related to its tendency to dissociate adsorbed water molecules, and this was shown to be a general property of ionic surfaces. A method was devised for evaluating true activation energies and frequency factors. A mechanism of the Langmuir-Hinshelwood type is proposed.

10911* Further Studies of Nitrosyl Chloride as an Ionizing Solvent. Anton B. Burg and Donald E. McKenzie. *Journal of the American Chemical Society*, v. 74, June 20, 1952, p. 3143-3147.

27 references.

10912* The Reaction of Fluorine With Zinc, Nickel and Some of Their Binary Compounds. Some Properties of Zinc and Nickel Fluorides. Helmut M. Haendler, William L. Patterson, Jr., and Walter J. Bernard. *Journal of the American Chemical Society*, v. 74, June 20, 1952, p. 3167-3168.

23 references.

10913* High Temperature Heat Contents of Magnesium Orthotitanate and Magnesium Dititanate. R. L. Orr and J. P. Coughlin. *Journal of the American Chemical Society*, v. 74, June 20, 1952, p. 3186-3187.

10914 Procedures in Ice Calorimetry. H. T. Spengler and W. S. Tamplin. *Analytical Chemistry*, v. 24, June 1952, p. 941-944.

Describes a simple Bunsen ice calorimeter and bath designed for the rapid and reasonably precise determination of enthalpy and related thermal data. Extends ice calorimetry to the determination of heats of vaporization at 0°C. and enthalpies at temperatures down to −77°C. Table, apparatus diagrams, and graphs. 14 ref.

10915 Improved Stirrer For Special Freezing Point Determinations. Samuel Kaye. *Analytical Chemistry*, v. 24, June 1952, p. 1038-1040.

Describes a modification of the standard procedure for determining freezing and melting points of many hydrocarbons and synthesis intermediates. The reciprocating stirrer of NBS is replaced by a rotary, vane-type stirrer. Comparison data are given. Apparatus diagram and graphs.

10916* Contribution to the Chemistry of Beryllium: Reduction of the Sulfate; Sulfidization of the Oxide; New Reactions of the Chloride. (French.) Pierre Silber. *Annales de Chimie*, ser. 12, v. 7, Mar.-Apr. 1952, p. 182-233.

First part describes dry reactions for production of Be sulfide from the sulfate or the oxide: reduction of sulfate by S vapor, by CO_2, by CaC_2, by Zn, and by Al; and action of CS_2 on Be.

Second part deals with reactions in organic anhydrous media. 34 ref.

10917* Thermodynamic Properties of Nitrogen as Functions of Pressure and Temperature Between 0 and 6000 Atmospheres and —125° and +150°C. R. J. Lunbeck, A. Michels, and G. J. Wolkers. *Applied Scientific Research*, v. 3, sec. A, no. 3, 1952, p. 197-210.

Extensive tables and diagrams.

10918* The Dielectric Properties of Systems Containing Straight Polar Chains. R. A. Sack. *Australian Journal of Scientific Research*, ser. A, v. 5, Mar. 1952, p. 135-145.

A mathematical derivation of the above properties. The theory provides an explanation for the high dielectric losses at low frequencies observed in many solids containing hydroxyl groups. It can further explain the low-frequency absorption found in ionic crystals containing lattice imperfections. 23 ref.

10919* The Rheology of Plastic Disperions. P. A. Briscoe, W. J. Dunning, and R. C. Seymour. *British Journal of Applied Physics*, v. 3, June 1952, p. 193-196.

Describes behavior of a system containing 80% by volume of a powdered solid, which shows plastic deformation but does not conform to the Bingham or Freundlich concepts of plasticity. Graphs. 14 ref.

10920 Orientated Crystal Deposition (Epitaxy). *Chemical Age*, v. 66, June 7, 1952, p. 863-864.

Describes and discusses the above, stressing scientific and industrial importance. Reviews recent investigations described in the literature.

10921* Heats, Free Energies, and Entropies in Liquid Ammonia. William L. Jolly. *Chemical Reviews*, v. 50, June 1952, p. 351-361.

A compilation of data. 36 ref.

10922* Inorganic Free Radicals in Solution. N. Uri. *Chemical Reviews*, v. 50, June 1952, p. 375-454.

A comprehensive, descriptive review. 347 ref.

10923* Unsymmetrical Diselenides. (German.) Heinrich Rheinboldt and Ernesto Giesbrecht. *Chemische Berichte*, v. 85, May 1952, p. 357-368.

Preparation of 21 derivatives of the above group is described. Their thermal behavior, for instance in oxidation and alkaline hydrolysis, was investigated. 34 ref.

10924* Production of Sulfuric Acid From Magnesium Sulfate. (German.) B. Schätzel. *Chemische Technik*, v. 4, Mar. 1952, p. 114.

Discusses briefly successful experiments on above.

10925* Calculation of Number of Theoretical Plates Necessary For the Separation of Ideal Binary Mixtures. (German.) Herbert Pohl. *Erdöl und Kohle*, v. 5, May 1952, p. 291-294.

Proposes formulas for the above, both for infinite, and for finite, reflux ratios. Derivation of the formulas is indicated. Extensive tables.

10926* The Molecular Complexity of Sulphur in the Liquid and Vapour. Geoffrey Gee. *Transactions of the Faraday Society*, v. 48, June 1952, p. 515-526.

Previously published data are re-examined, in the light of current theories of the properties of polymer solutions, to give new estimates of the molecular complexity of liquid sulfur. It is concluded that polymeric sulfur appears rather abruptly at 159°C. as the temperature is increased, the proportion of polymer in the equilibrium liquid then rising steadily with temperature. 20 ref.

10927* Electric Transport in Liquid Silicates. J. O'M. Bockris, J. A. Kitchener, and A. E. Davies. *Transactions of the Faraday Society*, v. 48, June 1952, p. 536-548.

Determination of the amount of ionic conductance in the liquid systems Li_2O+SiO_2, $CaO+SiO_2$, $MnO+SiO_2$, $FeO+SiO_2$, and $PbO+SiO_2$ was made by measurement of the volumes of CO and CO_2 evolved at a carbon anode during electrolysis. Cationic transport numbers in melts of the systems K_2O+SiO_2 and Li_2O+SiO_2 were measured and indicate a uni-cationic mechanism. Anodic discharge reactions in silicates and calculation of transport numbers therein are discussed. 22 ref.

10928* The Oxidation of Hydrogen Sulphide by Potassium Iodate. A. R. Vasudeva Murthy and B. Sanjiva Rao. *Proceedings of the Indian Academy of Sciences*, v. 35, sec. A, Feb. 1952, p. 99-101.

10929* The Optical Properties of Titanium Dioxide. T. Radhakrishnan. *Proceedings of the Indian Academy of Sciences*, v. 35, sec. A, Mar. 1952, p. 117-125.

Dispersion formulas valid in the visible region are offered for rutile, anatase, and brookite. These incorporate a characteristic frequency at 2870 A in all the cases. Refractive indices and birefringence of rutile are calculated on the basis of Bragg's theory. Results are in good accord with observed data. 10 ref.

10930* A Simple Method For the Study of Variation of Boundary Tension With Time. R. S. Subrahmanya, M. R. A. Rao, and B. Sanjiva Rao. *Proceedings of the Indian Academy of Sciences*, v. 35, sec. A. Mar. 1952, p. 136-144.

In the method described, advantages of the pendant-drop method are combined with those of the drop-weight method. The method consists in forming a small drop of the solution at the end of a vertical capillary placed inside a thermostat. The drop is allowed to age, and the time required for the drop to fall is noted. The boundary tension is calculated by applying Harkins' corrections for the volume of the ideal drop. 16 ref.

10931* Effect of Pyridine on the Reduction of Oxygen in Pulsating Fields. K. S. G. Doss and A. Kalyanasundaram. *Proceedings of the Indian Academy of Sciences*, v. 35, sec. A, Apr. 1952, p. 173-177.

Data on behavior of NaOH-pyridine mixtures in pulsating fields are charted and discussed.

10932 Nucleation Phenomena. Charles M. Cooper. *Industrial and Engineering Chemistry*, v. 44, June 1952, p. 1269-1338.

18th annual Christmas Chemical Engineering Symposium presented in part before the ACS Division of Industrial and Engineering Chemistry at Northwestern University, Evanston, Ill., Dec. 27-28, 1951. 5 papers on theory or review, 3 on nucleation from gases, 4 on nucleation from liquids, and 5 on nucleation from solids.

10933 Catalysis by Anion Exchange Resins. Claude J. Schmidle and Richard C. Mansfield. *Industrial and Engineering Chemistry*, v. 44, June 1952, p. 1388-1390.

Use of above resins as catalysts for cyanohydrin formation, benzoin condensations, diacetone alcohol formation, cyanoethylation reactions, and nitro alcohol formation.

10934 Vapor Pressure-Temperature Relationships of Sulfur Compounds Related to Petroleum. P. T. White, D. G. Barnard-Smith, and F. A. Fidler. *Industrial and Engineering Chemistry*, v. 44, June 1952, p. 1430-1438.

Describes measurement of vapor pressure-temperature relationships for 15 alkane sulfides, 8 alkane disulfides, 9 cyclic sulfides, and 3 thiophenes. The Antoine vapor-pressure equation was evaluated for results on each compound. Certain correlations are then apparent between normal boiling points and the B and C constants of the alkane sulfides and disulfides and their structure. Latent heats of vaporization of the various sulfur compounds were calculated. 21 ref.

10935 The System Sodium Oxide—Phosphorus Pentoxide —Water. Bernard Wendrow and Kenneth A. Kobe. *Industrial and Engineering Chemistry*, v. 44, June 1952, p. 1439-1448.

32 references.

10936 Equilibrium in the System Silicon Tetrafluoride—Water. F. A. Lenfesty, Thad D. Farr, and J. C. Brosheer. *Industrial and Engineering Chemistry*, v. 44, June 1952, p. 1448-1450.

10937 Vacuum Distillation; Variables in Packed Column Distillation at Subatmospheric Pressures. Max S. Peters and M. R. Cannon. *Industrial and Engineering Chemistry*, v. 44, June 1952, p. 1452-1459.

Two new methods for predicting maximum allowable velocity

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in packed distillation columns at any operating pressure are presented. Both gave good accuracy and are easily applied. Experimental data indicate that separating efficiency of some packings increases and that of others remains constant when pressure is reduced. Data showing effect of change in operating pressure on pressure drop per unit packed height and on pressure drop per theoretical plate are given.

10938 Separation of Gases by Means of Permeable Membranes; Permeability of Plastic Membranes to Gases. David William Brubaker and Karl Kammermeyer. *Industrial and Engineering Chemistry*, v. 44, June 1952, p. 1465-1474.

Permeability data are reported for a considerable number of commercial and experimental plastic films, representative of the important types. Definite recommendations for determining permeabilities in relation to temperature are presented. 28 ref.

10939 Effect of Holdup-Charge Ratio in Laboratory Ternary Batch Distillation. Arthur Rose and Victor J. O'Brien, Jr. *Industrial and Engineering Chemistry*, v. 44, June 1952, p. 1480-1486.

Experimental studies were with the system n-heptane—methylcyclohexane—toluene in a glass column, packed with 1/16 in., 36-gage helices. Comparison of batch-distillation curves of the experimental ternary and binary runs under identical conditions of reflux ratio and charge of each component. General effects of holdup in the ternary batch distillations studied were the same as for binary systems.

10940 Get 'Em While They're Hot. *Industrial and Engineering Chemistry*, v. 44, June 1952, p. 11A, 13A.

Discusses problems of utilization of radioactive fission products to produce chemical transformations in organic and inorganic compounds. Briefly outlines a series of possibilities in the organic field.

10941 Correlating Solubility and Distribution Coefficient Data. Donald F. Othmer and Mahesh S. Thakar. *Industrial and Engineering Chemistry*, v. 44, July 1952, p. 1654-1656.

Mathematical treatment of the above.

10942 The Chromatographic Purification of Inorganic Salts On Activated Alumina. B. A. J. Lister. *Journal of Applied Chemistry*, v. 2, May 1952, p. 280-283.

Solutions of Zn, Cd, Mn, Mg, Sr, and Ba salts and of ammonium and sodium tungstates were freed from trace impurities of Fe, Cu, Ag, and Pb by one passage through a column packed with activated alumina. Results are discussed. Tables.

10943 Diffusion Coefficients of Ethanol in Aqueous Solutions. I. E. Smith and J. Anderson Storrow. *Journal of Applied Chemistry*, v. 2, May 1952, p. 225-235.

Above were measured at temperatures up to 72.5°C. From extrapolated values, the variation of diffusion coefficient with composition at normal boiling point was found. 27 ref.

10944 Production of Lanthanon and Thorium Compounds From Monazite. E. S. Pilkington and A. W. Wylie. *Journal of Applied Chemistry*, v. 2, May 1952, p. 265-273.

A partly cyclic process is described for the separation of mixed hydroxides of the Ce-group elements into cerous salts and into concentrates containing, La salts, mixed Pr-Nd-Sm hydroxides or nitrates, and crude thorium phosphate. 15 ref.

10945 The Chemical Effects of Ultrasonics. Virginia Griffing. *Journal of Chemical Physics*, v. 20, June 1952, p. 939-942.

A study of the effects of ultrasonics on the inversion of sucrose was made. Negative results were obtained. These results are discussed.

10946 Isotopic Composition of Oxygen in the Catalytic Decomposition of Hydrogen Peroxide. Malcolm Dole, Deforest P. Rudd, Gordon R. Muchow, and Charles Comte. *Journal of Chemical Physics*, v. 20, June 1952, p. 961-968.

The above was measured, using MnO_2, Fe_2O_3, colloidal Au, metallic Pt, and soluble catalase as catalysts. A few rate experiments were also carried out, and the kinetics studied from the standpoint of isotope separation as a function of fraction of H_2O_2 decomposed.

10947 Diffusion in the System $C^{14}O_2$—CO_2 to 1000 Atmospheres Pressure. K. D. Timmerhaus and H. G. Drickamer. *Journal of Chemical Physics*, v. 20, June 1952, p. 981-984.

Diffusion coefficients are presented for the above system between 100-1000 atm. and at 0, 25, and 50°C. Results are discussed. Graphs and tables.

10948 Gaseous Detonations. V. Nonsteady Waves in CO—O_2 Mixtures. G. B. Kistiakowsky, Herbert T. Knight, and Murray E. Malin. *Journal of Chemical Physics*, v. 20, June 1952, p. 994-1000.

The velocity of steady detonation waves in 2.5 $CO+O_2$ mixtures containing H_2 is shown to agree with the calculations of the Chapman-Jouguet theory. Photographic observations show that the detonations developing behind the shock front are initially localized near the opposite walls of the cylindrical tube, while the gage records demonstrate that the fronts of nonsteady waves are not normal to the tube axis but undergo irregular gyrations. The significance of these observations in terms of the rates of chemical reactions in shock fronts is discussed. Graphs and tables. 17 ref.

10949 Steric Factor and Activation Energy of the Reaction $Na+C_2H_5Cl=NaCl+C_2H_5$. R. J. Cvetanovic and D. J. Le Roy. *Journal of Chemical Physics*, v. 20, June 1952, p. 1016-1020.

The above reaction was studied between 260-380°C. by the diffusion-flame method. From the temperature coefficient of the rate constant, activation energy was found to be 10.2 kcal. per mole. Schematic diagram of apparatus is shown. 16 ref.

10950 Carbon-Oxygen Exchange in Chemisorbed Carbon Monoxide. R. P. Eischens and A. N. Webb. *Journal of Chemical Physics*, v. 20, June 1952, p. 1048-1049.

Brief treatment of the chemisorption of CO on Fe. Tables.

10951 The Hydrothermal Chemistry of Silicates. Part II. Synthetic Crystalline Sodium Aluminosilicates. R. B. Barrer and E. A. D. White. *Journal of the Chemical Society*, May 1952, p. 1561-1571.

Hydrothermal reactions of sodium aluminosilicate gels were investigated between 150 and 450°C. Crystal growth was examined in absence and in presence of additional sodium compounds. All compounds were characterized by optical and x-ray methods. Some ion-exchange reactions were studied.

10952 Absorption Spectra of Substances Containing the Carbon-Iodine Bond. Part II. T. M. Dunn and T. Iredale. *Journal of the Chemical Society*, May 1952, p. 1592-1597.

The absorption spectra of iodobenzene, the iodonaphthalenes, and 2-iododiphenyl in the near ultraviolet are described.

10953 The Chemistry of Bivalent Germanium Compounds. Part II. Some Complex Compounds of Bivalent Germanium. D. A. Everest. *Journal of the Chemical Society*, May 1952, p. 1670-1672.

The following new complex compounds of bivalent germanium were prepared: $GeI_2 \cdot 2NH_2Me$; $Ge(H_2PO_2)_2 \cdot GeCl_2$; and $3Ge(H_2PO_2)_2 \cdot GeBr_2$. They resemble the corresponding tin compounds. GeO_2, in contrast to $Sn(OH)_4$, is reduced to the bivalent state when heated alone with hypophosphorous acid.

10954 Magnetochemistry of the Heaviest Elements. Part VI. PuO_2-ThO_2 and PuF_4-ThF_4 Solid Solutions. J. K. Dawson. *Journal of the Chemical Society*, May 1952, p. 1882-1886.

Magnetic susceptibilities of PuO_2 and PuF_4 were measured over the range 90–450°K. The tetrafluoride obeys the Curie-Weiss law above 200°K., but there is an upward curvature below that temperature. Measurements on solid solutions of the tetrafluoride in isomorphous ThF_4 lead to an extrapolated susceptibility at infinite dilution in agreement with a $5f^1$ electron configuration.

10955 The Direct Calculation of True Dipole Moments From Measurements on Solutions or Pure Liquids. A. D. Buckingham and R. J. W. Le Févre. *Journal of the Chemical Society*, May 1952, p. 1932-1936.

An empirical relationship is presented. Comparisons made by application to a number of polar liquids, representative of different molecular shapes, show that the new equation is superior to others previously proposed.

10956* The Absorption of Some Organic Bases by Carboxylic Acid Ion-Exchange Resins. Part I. Equilibrium Studies. L. Saunders and R. S. Srivastava. *Journal of the Chemical Society*, June 1952, p. 2111-2118.

10957* The Separation of Germanium Tetrachloride From Arsenic Trichloride by Fractional Distillation. H. J. Cluley and R. C. Chirnside. *Journal of the Chemical Society*, June 1952, p. 2275-2276.

10958* The Separation of Quadrivalent and Quinquevalent Vanadium From Phosphoric Acid by Ion-Exchange Resins; Some Observations on the Reduction of Quinquevalent Vanadium by Ion-Exchange Resins. J. E. Salmon and H. R. Tietze. *Journal of the Chemical Society*, June 1952, p. 2324-2326.

10959* Complexes Involving Tervalent Iron and Orthophosphoric Acid. Experiments With Ion-Exchange Resins. J. E. Salmon. *Journal of the Chemical Society*, June 1952, p. 2316-2323.

Shows that Fe can be removed from ferric phosphate solutions by using either cation-exchange or anion-exchange resins. Batch experiments with the phosphate form of the anion-exchange resin indicate presence in the solutions of a complex containing 3 phosphate groups per Fe atom.

10960* Preparation of Crystalline Nitrides of Vanadium and Niobium. F. H. Pollard and G. W. A. Fowles. *Journal of the Chemical Society*, June 1952, p. 2444-2445.

10961* Preperation of Deuterized Raney Nickel and Selective Deuteration of the Triple Bond. N. A. Kahn. *Journal of the American Chemical Society*, v. 74, June 20, 1952, p. 3018-3022.

Procedure is described for the above. A comparative study of hydrogenation and deuteration was made, and selective deuteration is shown to be as effective as hydrogenation. Composition of the crude products obtained by the selective deuteration of the triple bond was determined by an analytical scheme. A plausible explanation for the unusual selectivity of reduction of symmetrical acetylenic compounds by deuterium or hydrogen is presented. A method of preparation of a Raney nickel catalyst, designated W-8, containing much less hydrogen than other varieties, and free of the lighter variety of the catalyst containing alumina, is also reported. 25 ref.

10962* Association Between Polysilicic Acid and Polar Organic Compounds. R. K. Iler. *Journal of Physical Chemistry*, v. 56, June 1952, p. 673-677.

The relative degree of association between the above is related to structure of above organic compounds. This association was measured by noting the solubilizing effect of the organic compounds on the precipitate obtained by mixing solutions of polysilicic acid and gelatin. Tables.

10963* Studies of the Fischer-Tropsch Synthesis. XIII. Structural Changes of a Reduced Iron Catalyst on Reoxidation and on Formation of Interstitial Phases. W. Keith Hall, William H. Tarn, and Robert B. Anderson. *Journal of Physical Chemistry*, v. 56, June 1952, p. 688-691.

Tables. 41 ref.

10964* Critical Micelle Concentrations by a Bubble Pressure Method. A. S. Brown, R. U. Robinson, E. H. Sirois, H. G. Thibault, W. McNeill, and A. Tofias. *Journal of Physical Chemistry*, v. 56, June 1952, p. 701-705.

Above method of measuring surface tensions was modified by using it kinetically. Plots of bubble pressure against concentration were obtained for the commercial cationic and anionic materials lauryl pyridinium chloride, Santomerse #3, and Tergitol TMN-650. Numerous graphs.

10965* Kinetics of Chain Depolymerization. Robert Simha and L. A. Wall. *Journal of Physical Chemistry*, v. 56, June 1952, p. 707-715.

Treatment of the above includes a discussion of general rate equations, molecular-weight decrease, and conversion and reaction rates.

10966* Determination of Diffusion Coefficients From Rates of Evaporation. D. D. Kimpton and F. T. Wall. *Journal of Physical Chemistry*, v. 56, June 1952, p. 715-717.

Diffusion coefficients were measured for water vapor in combination with air, CH_4, C_2H_6, C_2H_2, C_3H_8, and SO_2 as well as for D_2O vapor in air. The measurements were made at several temperatures and mean molecular diameters were computed from the results.

10967* Temperature Coefficient of Heterogenous Reactions. A. C. Riddiford. *Journal of Physical Chemistry*, v. 56, June 1952, p. 745-748.

The extension of the Nernst diffusion theory to the general case of a solid-fluid system is utilized for a simple, general treatment of the above. 27 ref.

10968* The Synthesis of Organo-Bentonite Anhydrides. W. H. Slabaugh. *Journal of Physical Chemistry*, v. 56, June 1952, p. 748-751.

The acylation of bentonite clay was achieved by treating both the acid and various metal clay forms with benzoyl chloride and acetyl chloride in anhydrous media. Several types of analyses were made and methods for estimation of extent of acylation were developed.

10969* Surface Complexes on Carbon Blacks. I. High Temperature Evacuation Studies. II. The Adsorption of NH_3, C_2H_2, C_4H_{10}, CH_3NH_2, and Water Vapor. R. B. Anderson and P. H. Emmett. *Journal of Physical Chemistry*, v. 56, June 1952, p. 753-761.

In Part I, 4 commercial carbon blacks were studied at temperatures as high as 1200°C. and the evolved gases were collected and analyzed. In Part II, adsorption isotherms for the above were determined. 32 ref.

10970* The Dielectric Properties of Dispersed Liquids. I. The Theory of the Dielectric Constant. Henry C. Thacher, Jr. *Journal of Physical Chemistry*, v. 56, June 1952, p. 795-797.

Discusses the dielectric constant and absorption of emulsion and aerosols. 22 ref.

10971* A Jacobian Method for the Rapid Evaluation of Thermodynamic Derivatives, Without the Use of Tables. Richard C. Pinkerton. *Journal of Physical Chemistry*, v. 56, June 1952, p. 799-800.

10972* Research on the Properties of Hydrated Aluminum Oxide. Part II. (German.) Swarup Narain Tewari and Satyeshwar Ghosh. *Kolloid Zeitschrift*, v. 127, June 1952, p. 27-30.

Describes preparation of hydrated Al-oxide specimens of different chemical character by reacting Al chloride with NaOH solutions. Hydrogen and hydroxy-ion adsorption were studied. Results show that adsorption of H- and OH- ions drops with increasing temperature and age of specimen and that they can be explained by assumption of amphoteric behavior of hydrated oxides. Tables. 10 ref.

10973* Some Observations on the Behavior of a Mixture of Negatively Charged Colloidal Iron and Chromium Hydroxide. (German.) E. H. Daruwalla and G. M. Nabar. *Kolloid Zeitschrift*, v. 127, June 1952, p. 33-38.

10974* Viscosity and Constitution. (German.) L. Grunberg. *Kolloid Zeitschrift*, v. 126, May 1952, p. 87-97.

In this summary, an attempt is made to show the different conditions which determine the viscosity of liquids. Intermolecular forces were found to be the most important factor, while geometrical arrangement is less important than composition of the molecules and arrangement of the atoms in the molecule. Graphs and tables. 14 ref.

10975 Rotation-Vibration Spectra and Structure of Simple Polyatomic Molecules. G. Herzberg. *Nature*, v. 169, June 14, 1952, p. 997-1001.

Tells how precise quantitative information about the geometrical structure of simple polyatomic molecules, their moments of inertia, internuclear distances, and valence angles can be obtained by a study of their rotation and rotation-vibration spectra. 18 ref.

26. *Chemistry—General, Inorganic, and Physical*

10976 Progress Made in Design of Catalyst Activity Testing Units. F. Emerson Ivey, Jr., and P. L. Veltman. *Petroleum* Refiner, v. 31, June 1952, p. 93-100.

Describes progress in development of standard units and procedures for the above. Includes flow diagrams and illustrations, also typical tabular and graphical data.

10977* Time-Dependence of Boundary Tensions of Solutions. IV. Kinetics of Adsorption at Liquid-Liquid Interfaces. (English.) A. F. H. Ward and L. Tordai. *Recueil des Travaux Chimiques des Pays-Bas*, v. 71, May 1952, p. 572-584.

Various mechanisms are considered which may explain the variation of interfacial tension with time, when fatty acids are adsorbed from hexane onto a hexane-water interface. The Langmuir adsorption isotherm is proposed. A mechanism is suggested to explain the kinetics of adsorption and desorption and is found to be in accordance with experimental variation of interfacial tension with time. Velocity constants for adsorption and description are evaluated. Effect of temperature is also discussed. 12 ref.

10978 The Second Coefficient of Viscosity of Liquids and Gases. S. M. Karim and L. Rosenhead. *Reviews of Modern Physics*, v. 24, Apr. 1952, p. 108-116.

Includes classified bibliography. 144 ref.

10979* Differential Method for Kinetic Study of Gas-Phase Reactions. (French.) E. Freling and P. Dugleux. *Revue de l'Institut Francais du Pétrole et Annales des Combustions Liquides*, v. 7, Apr. 1952, p. 103-105.

Explains differential thermally-compensated method for kinetic study of oxidation by a static method. Apparatus diagrammed.

10980* Thermodynamics of Lime Manufacture. Part VI. *Rock Products*, v. 55, June 1952, p. 119-120, 123.

Discusses above, stressing the importance of balancing economic factors in the determination of optimum size of rotary kilns. Graphs.

10981 Vibration-Rotation Bands of Methane. D. R. J. Boyd, H. W. Thompson, and R. L. Williams. *Proceedings of the Royal Society*, ser. A, v. 213, June 5, 1952, p. 42-54.

The infrared absorption spectrum of CH_4 in the region of 3μ was investigated with higher resolving power than used previously. A very complex system of overlapping vibration bands was revealed and partially analyzed. Diagrams, tables, and graphs. 14 ref.

10982* Centers of Disturbance in the Surface. (German.) Georg-Maria Schwab. *Zeitschrift für Electrochemie; Berichte der Bunsengesellschaft für physikalische Chemie*, v. 56, Apr. 1952, p. 297-302.

Proposes a method for calculating the energies inherent in centers of disturbance in cation disturbed lattices, on the basis of electrostatic principles. Possible deductions for the catalytic effect of the disturbed lattice are discussed. Data are tabulated.

10983* An Explanation of the Influence of the Crystal Boundaries Upon the Lattice Energy of Finite Ion Crystals. (German.) Otto Emersleben. *Zeitschrift für Electrochemie; Berichte der Bunsengesellschaft für physikalische Chemie*, v. 56, Apr. 1952, p. 305-308.

Discusses the above and shows its dependence upon the dimensions of the crystal lattice.

10984* The Concept of Free Surface Energy in Very-Small Particles. (German.) Karl F. Herzfeld and Sidney G. Reed, Jr. *Zeitschrift für Electrochemie; Berichte der Bunsengesellschaft für physikalische Chemie*, v. 56, Apr. 1952, p. 308-310.

Proposes a method for calculating the free, effective surface energy for nitrogen nuclei of 2-8 molecules.

10985* Drop Formation on Negative and Positive Ions in Supersaturated Water Vapors. (German.) M. Pollermann. *Zeischrift für Electrochemie; Berichte der Bunsengesellschaft für physikalische Chemie*, v. 56, Apr. 1952, p. 313-317; disc., p. 317.

Drop formation on ions was investigated in a Wilson cloud chamber, by observing the path of ions in the electric field. Photographs.

10986* The State of Adsorption of Foreign Molecules on Conductive Surfaces. (German.) R. Suhrmann. *Zeitschrift für Electrochemie; Berichte der Bunsengesellschaft für physikalische Chemie*, v. 56, Apr. 1952, p. 351-360.

Elementary processes taking place on the surface of catalysts were studied. Describes procedures, with particular regard to the effect of electronic properties of the surface of the catalyst upon the reactants. Tables, charts, and micrographs. 33 ref.

10987* Sorption of Gases on Metal Films. (English.) F. C. Tompkins. *Zeitschrift für Electrochemie; Berichte der Bunsengesellschaft für physikalische Chemie*, v. 56, Apr. 1952, p. 360-363.

Discusses mechanisms of the above and methods for its study, with emphasis on catalytic effects.

10988* The Structure of the High Temperature Modifications of CuBr and CuI. (German.) J. Krug and L. Sieg. *Zeitschrift für Naturforschung*, v. 7a, May 1952, p. 369-371.

An x-ray method was used to study the α and β modifications of CuBr and CuI in order to determine their structures. Results are tabulated. 10 ref.

10989* Direct and Alternating-Current Resistance of Diffusion Polarization Under Locally Variable Exchange-Current Density at the Electrode. (German.) Klaus J. Vetter. *Zeitschrift für physikalische Chemie*, v. 199, Apr. 1952, p. 300-313.

Theoretical, mathematical analysis plus graphical interpretation.

10990* Diffusion in Gases. II. Relation Between Self Diffusion and Viscosity. Diffusion in Inert Gases and Hydrogen. (German.) Leonid Andrussow. *Zeitschrift für physikalische Chemie*, v. 199, Apr. 1952, p. 314-329.

12 references.

10991* Viscosity and Diffusion in the Gaseous Phase. IV. Computation of the Viscosity of Pure Gases and Their Mixtures. Temperature Coefficient of Viscosity. (German.) Leonid Andrussow. *Zeitschrift für physikalische Chemie*, v. 199, Apr. 1952, p. 330-344.

19 references.

10992* Non-Aqueous Lithium Metacolumbate. (Russian.) A. V. Lapitskii. *Zhurnal Obshchei Khimii*, v. 22 (84), Jan. 1952, p. 38-41.

Describes two methods of producing the above. Specific gravity was found to depend on the method of synthesis. Data are tabulated.

10993* Calorimeter for Determining the Latent Heat of Vaporization of High Volatile Liquids at Various Temperatures. (Russian.) S. M. Skuratov and O. N. Kachinskaia. *Zhurnal Obshchei Khimii*, v. 22(84), Jan. 1952, p. 76-81.

Construction and operation of the calorimeter are discussed. Typical data are tabulated.

10994* Fusibility of the PbO-V_2O_5-TiO_2 Ternary System. (Russian.) I. N. Beliaev and A. K. Nesterova. *Zhurnal Obshchei Khimii*, v. 22(84), Mar. 1952, p. 396-403.

The melting-point curves of the above system were studied. Data are tabulated and charted. Recommendations are made for production of large crystals of lead metatitanate and titanium dioxide.

Miscellaneous Publications

10995 Application of Four-Dimension Figures in Physicochemical Analysis. (Russian.) F. M. Perel'man and A. Ia. Zvorykin. "Izvestiia Sektora Fiziko-Khimicheskogo Analiza", v. 20 (Academy of Sciences of the USSR), p. 19-28. (QD453 Ak13i)

Discusses the construction and use of 4-dimensional equilibrium diagrams. (Time is the 4th dimension.)

10996 Peculiarities of Constitution Diagrams of Quaternary Mutual Systems in Melts. (Russian.) A. P. Palkin. "Izvestiia Sektora Fiziko-Khimicheskogo Analiza", v. 20 (Academy of Sciences of the USSR), p. 144-164. (QD453 Ak13i)

Presents a theoretical discussion and review of the above for systems such as K, Na/Cl, Br, I; and Tl, Na/NO_3, Cl, SO_4. 30 ref.

10997 The Activity of Components of Solutions in Liquid Hydrogen Fluoride. (Russian.) N. S. Nikolaev and I. V. Tananaev. "Izvestiia Sektora Fiziko-Khimicheskogo Analiza", v. 20 (Academy of Sciences of the USSR), p. 184-211. (QD453 Ak13i)

A series of 3 reports on the above. The 1st 2 deal with fluorides of the alkali metals. The 3rd is concerned with HF in ammonium-base solutions. 32 ref.

10998 Physiochemical Analysis of Systems of Importance in Analytical Chemistry. XXII. Investigation of Solubilities in the AlF_3-KF-H_2O System at 25°C. (Russian.) I. V. Tananaev and M. A. Nekhamkina. "Izvestiia Sektora Fiziko-Khimicheskogo Analiza", v. 20 (Academy of Sciences of the USSR), p. 227-237. (QD453 Ak13i)

10999 Solubility of Dolomite in Aqueous Solutions of Salts. (Russian.) O. K. Ianat'eva. "Izvestiia Sektora Fiziko-Khimicheskogo Analiza", v. 20 (Academy of Sciences of the USSR), p. 252-268. (QD453 Ak13i)

The above was investigated for various solutions of $CaCO_3$, $MgCO_3$, $CaSO_4$, and $MgSO_4$ containing up to 2% NaCl. Data are tabulated and charted. 24 ref.

11000 Kinetics of the Transformations of Carnallite and Magnesium Sulfate Hexahydrate in Kainite. (Russian.) V. I. Nikolaev and Kh. B. Fradkina. "Izvestiia Sektora Fiziko-Khimicheskogo Analiza", v. 20 (Academy of Sciences of the USSR), p. 269-276. (QD453 Ak13i)

Results of experimental study. Tables and graphs.

11001 Thermographic Method of Determining Thermal Effects. (Russian.) A. F. Kaputinskii and Iu. P. Barskii. "Izvestiia Sektora Fiziko-Khimicheskogo Analiza", v. 20 (Academy of Sciences of the USSR), p. 317-325. (QD453 Ak13i)

Discusses the above. Data are tabulated and charted. 27 ref.

11002 Relationship of Rate of Transformation to Composition, and Conditions for the Appearance of Metastable States. (Russian.) N. N. Sirota. "Izvestiia Sektora Fiziko-Khimicheskogo Analiza", v. 20 (Academy of Sciences of the USSR), p. 326-340. (QD453 Ak13i)

A theoretical discussion plus graphical interpretation. 19 ref.

11003 Solubility Diagrams of Two-Component Systems in Which an Incongruently Fused Chemical Compound is Formed. (Russian.) A. A. Bulakh. "Izvestiia Sektora Fiziko-Khimicheskogo Analiza", v. 20 (Academy of Sciences of the USSR), p. 351-360. (QD453 Ak13i)

Presents a discussion of 2-component systems in which a high-melting-point chemical compound of the intermetallic type is formed. 12 ref.

11004 Integral Heats of Vaporization of Liquid Systems. (Russian.) N. L. Iarym-Agaev. "Izvestiia Sektora Fiziko-Khimicheskogo Analiza", v. 20 (Academy of Sciences of the USSR), p. 361-375. (QD453 Ak13i)

Presents a theoretical discussion and experimental data on the above. Data are charted and tabulated.

11005 True Solutions in Mixed Solvents. (Russian.) L. I. Krishtalik. "Izvestiia Sektora Fiziko-Khimicheskogo Analiza", v. 20 (Academy of Sciences of the USSR), p. 376-382. (QD453 Ak13i)

Experiments were made on systems containing: $HgCl_2$, C_6H_6, and $C_2H_4Cl_2$; $HgBr_2$, C_6H_6, and $C_2H_4Cl_2$; $C_{10}H_8$, C_6H_6, and CS_2; S, $C_2H_4Cl_2$, and C_6H_6; S, $C_2H_4Cl_2$, and $C_6H_5CH_3$; and other similar systems. Results agree well with the proposed theory. Tables and graphs. 13 ref.

11006 Isochrones-Isotherms of the Solution of Apatite in the H_2SO_4-H_3PO_4-H_2O Systems as Examples of Topochemical Kinetics, and of the Production of Superphosphate. (Russian.) E. B. Brutskus and M. L. Chepelevetskii. "Izvestiia Sektora Fiziko-Khimicheskogo Analiza", v. 20 (Academy of Sciences of the USSR), p. 383-388. (QD453 Ak13i)

An experimental study. Graphs.

Books

11007 Electrical Phenomena at Interfaces in Chemistry, Physics and Biology. J. A. V. Butler, editor. 309 pages. 1951. Macmillan Co., New York (QC609 B97e)

A successor to "Electrocapillarity—The Chemistry and Physics of Electrodes and Other Charged Surfaces", but largely a new work. Covers most of the basic researches on electrical phenomena at interfaces, with a full account of their applications in colloid science, electrochemistry, biochemistry, and physiology. Selected papers are separately abstracted.

11008 Valence. C. A. Coulson. 338 pages. 1952. Oxford University Press, London. (QD469 C83v)

Deals with diatomic and polyatomic molecules, as well as with aromatic systems. Other topics treated include the basis of stereochemistry, hyperconjugation, hybridization, and the hydrogen bond. A notable feature is the parallel use of molecular-orbital methods and the valence-bond resonance method.

11009* A Short Guide to Chemical Literature. G. Malcolm Dyson. 144 pages. 1951. Longmans, Green and Co., London and New York (Z5521 D98s)

Main function of the work is to indicate to the student the general avenues of approach to the information contained in "the literature". In each section, especially in those relating to textbooks and journals, examples are given.

11010 Khimiia Kremnia i Fizicheskaia Khimiia Silikatov. (The Chemistry of Silicon and the Physical Chemistry of Silicates.) (Russian.) K. S. Evstrop'ev and N. A. Toropov. 364 pages. 1950. State Publishing House of Construction-Material Literature, Moscow, U.S.S.R. (QD181.56 Ev79k)

A textbook, subjects covered include the structure of silicates in crystalline, vitreous and fused states; bases of the theory of constructing constitution diagrams for silicate systems and their application; and description of high-Si compounds.

11011 Fluoreszenz Organischer Verbindungen. (Fluorescence of Organic Compounds.) Theodor Förster. 312 pages. 1951. Vandenhoeck & Ruprecht, Göttingen, Germany. (QC477 F68f)

Deals with experimental methods and theoretical principles of above, discussing in considerable detail the theory of valence as a source of insight into the electron structure of organic molecules. A concluding chapter discusses phosphorescence of organic compounds. Diagrams, tables, graphs, spectrograms, and bibliography.

11012 The Physical Chemistry of Surface Films. William D. Harkins. 413 pages. 1952. Reinhold Publishing Corporation. (QD503.H3 H22p)

Covers all the fundamental pioneer work of the late author on the mechanism of liquid-liquid films and interfaces, surface tension, emulsification, energetics of surfaces, nature of films on liquid and solid subphases, and properties of solutions of long-chain electrolytes. Also includes an introductory study of the electric layer by E. M. Verwey. Some of the material has appeared in earlier publications.

See also:

10142 (decomposition of n-hexane on metallic Ni)
10333 (interaction of Zn ions and Na silicates)
10340 (dissolution of Zn in HCl-CH_3OH-H_2O)
10377 (electrochromatography on filter paper)
10437 (double zoning in column chromatography)
10466 (hot-wire manometers in chemistry)
10530 (cell for high-temperature electrochemical studies)
10868 (atomic pile chemistry)
11052 (organic derivatives of montmorillonite)
11317 (mathematics of adsorption and flow in beds)
11372 (role of foreign atoms in catalysis)
11557 (handbook of physiological chemistry)
11564 (dictionary of antibiosis)

27. CHEMISTRY—ORGANIC

11013* Catalytic Hydrogenation Under Constant Pressure. (Russian.) D. V. Sokol'skii and O. S. Popov. *Doklady Akademii Nauk SSSR*, new ser., v. 83, Apr. 1952, p. 873-875.

Experimental hydrogenation of methylethylacetylene carbinol

27. *Chemistry—Organic*

on skeletal Ni at 0, 20, 40, and 50°C. and 2.0, 2.5, and 3.0 atm. was carried out in special equipment. Tables and graphs.

11014* Alkylaton of Isopropylbenzene Acetylene Using H_3PO_4, BF_3, and HgO Catalysts. (Russian.) V. L. Vaiser and A. M. Polikarpova. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 1, 1952, p. 71-72.

The above reaction was carried out with varying amounts of catalyst, various lengths of time, and at different temperatures. Data are tabulated.

11015* Process of Electroreduction of Acetone Depending on the Nature of the Cathode and Catalyst. (Russian.) N. A. Izgaryshev and I. I. Ariamova. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 11, 1952, p. 313-315.

Discusses the above, giving some numerical data.

11016 The Hydrogenation of Ethylene Over Copper. I. Reproducing the Activity of the Catalyst. Charles Law McCabe and G. D. Halsey, Jr. *Journal of the American Chemical Society*, v. 74, June 5, 1952, p. 2732-2734.

One of the factors which determines the activity of a reduced copper catalyst toward hydrogenation of ethylene is the amount of chemisorbed hydrogen on the catalyst surface. Kinetic experiments show that this hydrogen does not serve as a reactant. It thus can be considered to function as part of the catalyst. Three distinct methods of getting varying amounts of chemisorbed hydrogen on the surface were employed; activity of the catalyst as a function of amount of chemisorbed hydrogen is reported.

11017 Some Studies of the Polarography of Aromatic Ketones. R. A. Day, Jr., S. R. Milliken, and W. D. Shultz. *Journal of the American Chemical Society*, v. 74, June 5, 1952, p. 2741-2744.

Polarographic reduction of fluorenone, benzophenone, α-benzoylnaphthalene, and benzanthrone was studied in solutions of different ethanol concentrations and at various pH values.

11018* The Distribution of Liquid and Solid Fischer-Tropsch Hydrocarbons by Carbon Number. Milton Manes. *Journal of the American Chemical Society*, v. 74, June 20, 1952, p. 3148-3151.

An equation is derived for calculating distribution by carbon number of Fischer-Tropsch hydrocarbons, based on assumptions that chain growth in the synthesis proceeds by stepwise addition of single carbon atoms, and that the probability of growth of a given hydrocarbon chain is independent of carbon number above C_5, although it may vary with experimental condition. Applicability to relatively crude fractionation data from a wide variety of sources is demonstrated. 20 ref.

11019* The Basis for the Report that Rearrangements Occur When Cyclopentyl Iodide and Cyclohexyl Iodide React With Silver Nitrite. Natham Kornblum and Charles Teitelbaum. *Journal of the American Chemical Society*, v. 74, June 20, 1952, p. 3076-3078.

No rearranged products were found. Instead, pure cyclopentyl and cyclohexyl nitrates were isolated. 17 ref.

11020 Modified Signer Molecular Weight Apparatus. Lawrence M. White and Richard T. Morris. *Analytical Chemistry*, v. 24, June 1952, p. 1063-1064.

Above method for organic compounds was modified by elimination of a difficult glass-working operation. Table and apparatus diagram.

11021* Aluminium-Organic Synthesis in Olefinic-Hydrocarbon Range. (German.) Karl Ziegler. *Angewandte Chemie*, v. 64, June 21, 1952, p. 323-329.

Clarifies the course of a new type of reaction for addition of α-olefins to $LiAlH_4$ and AlH_3. It is also possible to reduce the C=C linkage in certain olefins with $LiAlH_4$ and AlH_3. Trialkyls also add to ethylene or α-olefins. At approx. 200°C., Al trialkyls act as catalysts and convert ethylene and other olefins into higher olefins by polymerization. 13 ref.

11022* Novel Catalytic Transformations of Olefins. (German.) Karl Ziegler, H. G. Gellert, H. Kuhlhorn, H. Martin, K. Meyer, K. Nagel, H. Sauer, and K. Zosel. *Brennstoff-Chemie*, v. 33, June 25, 1952, p. 193-200.

Research on above shows the effectiveness of cyanoalkali compounds and aluminum alkyls as catalysts for the dimerization and transformation of olefins. Diagram shows experimental arrangement.

11023 The Formation of Trifluoromethyl Radicals in the Gas Phase. J. W. Hodgins and R. L. Haines. *Canadian Journal of Chemistry*, v. 30, June 1952, p. 473-481.

Trifluoromethyl radicals were produced by reaction between atomic Na and iodo-, bromo-, and chlorotrifluoromethane in the diffusion flame apparatus. Information was obtained on the primary reaction, activation energy, radical decomposition, and reaction with H_2. Apparatus diagram and tables.

11024* Rate Laws and Mechanisms of Oxyanion Reactions With Bases. John O. Edwards. *Chemical Reviews*, v. 50, June 1952, p. 455-482.

A review. 199 ref.

11025* The Chemistry of Fluoranthene. S. Horwood Tucker and Margaret Whalley. *Chemical Reviews*, v. 50, June 1952, p. 483-538.

A review. 186 ref.

11026 Reactions of Acetaldehyde With Methanol. G. W. Meadows and B. deB. Darwent. *Canadian Journal of Chemistry*, v. 30, July 1952, p. 501-506.

The nature of the products obtained from reactions of acetaldehyde with methanol were investigated in neutral and acidic solutions by titration with iodine and sodium bisulfite, ultraviolet absorption, and infrared spectroscopy. 10 ref.

11027 Some Observations Concerning the Interpretation of Heats of Hydrogenation of Olefinic Substances. P. B. D. da la Mare. *Journal of the Chemical Society*, May 1952, p. 1602 1607.

Theoretical implications of a recent analysis of tautomeric equilibria governed by the hyperconjugative power of alkyl groups on the one hand, and the conjugative power of phenyl, carboxylate ion, carbethoxy, and cyano groups on the other, as well as of heats of hydrogenation of substituted ethylenes are scrutinized.

11028 Ion-Exchange Resins as Catalysts in the Hydrolysis of Esters. C. W. Davies and G. Garrod Thomas. *Journal of the Chemical Society*, May 1952, p. 1607-1610.

Rate constants and apparent activation energies are reported for the above, catalyzed in aqueous solution by ion-exchange resins in the hydrogen form.

11029 Kinetics of the Interaction of Hydrogen Chloride With Styrene in Presence of Stannic Chloride. Gwyn Williams and Hetty Bardsley. *Journal of the Chemical Society*, May 1952, p. 1707-1714.

11030 Cyclic Polymerisation of Acetylene. Examination of the $C_{10}H_{10}$ Fraction. D. S. Withey. *Journal of the Chemical Society*, May 1952, p. 1930-1932.

11031 The Chemistry of Ethylene Oxide. Part IV. The Kinetics of the Reaction of Ethylene Oxide in Pyridine Solutions of Hydrogen Halides. A. M. Eastham. *Journal of the Chemical Society*, May 1952, p. 1936-1945.

11032 Some Recent Developments in the Chemistry of Free-Radical Reactions in Solution. D. H. Hey. *Journal of the Chemical Society*, May 1952, p. 1974-1984.

Tilden Lecture. 29 ref.

11033 The Oxidation of Simple Organic Substances by Sodium Metaperiodate in Solutions Exposed to Daylight. Frank S. H. Head and G. Hughes. *Journal of the Chemical Society*, June 1952, p. 2046-2052.

The compounds investigated included formic acid and formaldehyde.

11034 Properties and Reactions of Free Alkyl Radicals in Solution. Part III. Some Reactions With Organic Halogen Compounds. M. C. Ford and William A. Waters. *Journal of the Chemical Society*, June 1952, p. 2240-2245.

11035 Studies of the Localization Theory of Organic Reactions. Part II. The Effects of Substituents. R. D. Brown. *Journal of the Chemical Society*, June 1952, p. 2229-2233.

The general theory of the effect of structural changes on chemical reactivity of an aromatic molecule, developed in Part I for changes corresponding to introduction of hetero-atoms or annelation of other ring systems, is now extended to embrace the effects of substituents. The change in localization energy produced by a substituent is shown to be related to certain conjugation energies of the substituent. The empirical relationships of conjugation energies to self-atom-polarizabilities are employed to facilitate calculation of change in localization energy. Results of the theory are illustrated by application to 9-phenyl- and 9,10-diphenyl anthracene.

11036* The Effect of Raney Nickel on Ethyl Alcohol Under Pressure and at High Temperature. (French.) Marcel Paty and Jean Deschamps. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 234, June 4, 1952, p. 2291-2292.

Describes experiments on the above. The liquid and gaseous products of above reaction are described.

11037 Electrolytic Reduction of Organic Compounds. VI. Aminophenols From Nitrocompounds. Christopher L. Wilson and Handady V. Udupa. *Journal of the Electrochemical Society*, v. 99, July 1952, p. 289-294.

The effect of various factors on aminophenol formation was determined and increased yields were obtained using a high-speed rotating cathode. Graphs and tables. 29 ref.

11038* Interaction of Thionyl Chloride and Esters of Aromatic Hydroxy Acids and Their Derivatives in Presence of Finely Divided Copper. IV. Interaction of Methyl-β-Resorcylate and Thionyl Chloride in Presence of Finely Divided Copper. G. V. Jadhav and V. N. Deshpande. *Proceedings of the Indian Academy of Sciences*, v. 35, sec. A, Mar. 1952, p. 114-116.

11039 Oxidation Characteristics of Some Diester Fluids. C. M. Murphy and Harold Ravner. *Industrial and Engineering Chemistry*, v. 44, July 1952, p. 1607-1612.

Part of a basic program for the study of the oxidation stability of diesters. Eicosane, a typical paraffin of approximately the same molecular weight as the diesters, was included for purposes of comparison. Much pertinent data is tabulated and graphed. 20 ref.

11040 Purified Chemicals and Resins From Phenol and Formaldehyde. H. L. Bender, A. G. Farnham, J. W. Guyer, F. N. Apel, and T. B. Gibb, Jr. *Industrial and Engineering Chemistry*, v. 44, July 1952, p. 1619-1623.

Tables and 28 ref.

11041 Vapor Pressures of the Light Normal Saturated Hydrocarbons. Robert E. Perry and George Thodos. *Industrial and Engineering Chemistry*, v. 44, July 1952, p. 1649-1653.

Investigations on the exact nature of the complex vapor-pressure function between the triple and critical points for the normal saturated hydrocarbons were carried out for establishment of coefficients for the vapor-pressure equation developed by Frost and Kalkwarf. Numerous graphs and tables. 27 ref.

11042 Sulfur Compounds as Antioxidants; Effect of Some Structural Variations on Potency. R. B. Thompson, J. A. Chenicek, and Ted Symon. *Industrial and Engineering Chemistry*, v. 44, July 1952, p. 1659-1662.

Investigation was undertaken on the alkylmercaptoketones, in order to investigate more fully the effect of various structural features on potency as antioxidants. Results are discussed. Features that lead to high antioxidant potency are pointed out and a more specific formulation to explain the antioxidant properties of the β-alkylmercaptoketones is advanced. Tables. 15 ref.

11043 Vapor-Liquid Equilibria of Some Fluorinated Hydrocarbon Systems. G. H. Whipple. *Industrial and Engineering Chemistry*, v. 44, July 1952, p. 1664-1667.

A study of the vapor-liquid equilibria of 5 binary highly fluorinated systems was made. Results are tabulated.

11044 Ternary Liquid Systems; 3-Heptanol-Water-Acetic Acid and 3-Heptanol-Water-Ethyl Alcohol. C. M. Oualline, Jr., and M. Van Winkle. *Industrial and Engineering Chemistry*, v. 44, July 1952, p. 1668-1670.

Graphs and tables.

11045 Phase Equilibria in Hydrocarbon Systems; Methane-n-Butane-Decane System at 40°F. H. H. Reamer, B. H. Sage, and W. N. Lacey. *Industrial and Engineering Chemistry*, v. 44, July 1952, p. 1671-1675.

Graphs and tables. 16 ref.

11046 Vapor Pressure-Composition Measurements on Aqueous Hydrazine Solutions. Jerome G. Burtle. *Industrial and Engineering Chemistry*, v. 44, July 1952, p. 1675-1676.

First extensive data to be published on the above. Tables. 14 ref.

11047 The Esterification of Tertiary Alcohols With Boric Acid. J. R. Anderson, K. G. O'Brien, and F. H. Reuter. *Journal of Applied Chemistry*, v. 2, May 1952, p. 241-244.

Above reaction was investigated and esterification was shown to occur using an azeotropic-distillation method. However, all reaction products decomposed on attempted purification. 12 ref.

11048 Preparation of Radioactive Penicillin. E. Lester Smith and D. J. D. Hockenhull. *Journal of Applied Chemistry*, v. 2, May 1952, p. 287-288.

Crystalline radioactive penicillin was prepared biosynthetically with a specific activity of over 1 c. per g. and was purified by solvent extraction and crystallized as the N-ethyl-piperidine salt.

11049 Studies of Ionization Efficiency. Part II. The Ionization Potentials of Some Organic Molecules. J. D. Morrison and A. J. C. Nicholson. *Journal of Chemical Physics*, v. 20, June 1952, p. 1021-1023.

Ionization potentials of some 83 organic molecules were measured with the mass spectrometer, using the critical-slope method to interpret the ionization-efficiency curves for the molecular ions. Results are compared with those obtained by spectroscopic and other methods, and some regularities in the discrepancies are pointed out. Tables. 14 ref.

11050 The Use of Alkyl Vinyl Ethers in Olefin Syntheses. D. C. Rowlands, K. W. Greenlee, J. M. Derfer, and C. E. Boord. *Journal of Organic Chemistry*, v. 17, June 1952, p. 807-811.

11051 Synthetic Plant-Growth Regulators. III. 2,4-Dichloro-phenoxyacetyl Derivatives of Amino Acids. John W. Wood and Thomas D. Fontaine. *Journal of Organic Chemistry*, v. 17, June 1952, p. 891-896.

Synthesis, chemical properties, and plant growth-regulating action. Tables. 10 ref.

11052* Organic Derivatives of Montmorillonite. W. F. Spencer and J. E. Gieseking. *Journal of Physical Chemistry*, v. 56, June 1952, p. 751-753.

The nature of the OH groups on montmorillonite was studied by attempting to replace these groups with organic groups. 16 ref.

11053* Electron Microscopic and Other Studies on a Copper-Cystine Complex. H. Kahler, B. J. Lloyd, Jr., and M. Eden. *Journal of Physical Chemistry*, v. 56, June 1952, p. 768-770.

Describes and discusses fibers obtained from a complex of cystine and Cu. In addition, this study deals with stoichiometric and other properties of the Cu complex in solution. Graphs and photomicrographs. 19 ref.

11054* The Infra-Red and Raman Spectra of Hydrocarbons. Part I. Acetylenes and Olefins. Norman Sheppard and Delia M. Simpson. *Quarterly Reviews*, v. 6, no. 1, 1952, p. 1-33.

A broad outline of progress made in interpretation of the above spectra of certain types of hydrocarbons. Numerous tables. 179 references.

11055* Aromatic Rearrangements. E. D. Hughes and C. K. Ingold. *Quarterly Reviews*, v. 6, no. 1, 1952, p. 34-62.

Considers in detail the following rearrangements: aromatic electropihlic; aromatic nucleophilic; and aromatic intramolecular. 75 ref.

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11056* Molecular Orbitals and Organic Reactions. R. D. Brown. *Quarterly Reviews*, v. 6, no. 1, 1952, p. 63-99.

Discusses results of experiments on the above. 111 ref.

11057* Solubility of Copper, Silver, and Mercury Acetylides. (Russian.) A. K. Babko and M. I. Grebel'skaia. *Zhurnal Obshchei Khimii*, v. 22(84), Jan. 1952, p. 66-76.

The above was investigated using a series of mineral and organic acids. Reactions of the acetylides with several Na and K compounds were also studied. Data are tabulated.

11057a* Polymerization-Depolymerization. VII. Structure of Isobutylene Tetramer. (Russian.) Ia. M. Slobodin and E. M. Markova. **VIII. Action of Metallic Sodium on 1, 4-Dibromobutene-2.** Ia. M. Slobodin and N. M. Vinokurova. *Zhurnal Obshchei Khimii*, v. 22(84), Jan. 1952, p. 102-109.

11058* Mixed Sulfides—Containing 11-20 Carbon Atoms and Their Basic Constants. (Russian.) I. N. Tits-Skvortsova, S. Ia. Levina, A. I. Leonova, and T. A. Danilova. *Zhurnal Obshchei Khimii*, v. 22(84), Jan. 1952, p. 135-138.

Preparation and properties.

11059* Investigation in the Field of Acid Catalysis. I. Kinetics and Mechanism of the Formaldehyde Reaction in Aqueous Acid Solutions. (Russian.) M. S. Nemtsov and K. M. Trenke. *Zhurnal Obshchei Khimii*, v. 22(84), Mar. 1952, p. 415-429.

20 references.

11060* Oxidizing and Oxidizing-Hydrolytic Transformations of Organic Molecules. XX. The Structure of Oxides of Unsaturated Compounds. (Russian.) M. M. Shemiakin, D. A. Bochvar, and L. A. Shchukina. *Zhurnal Obshchei Khimii*, v. 22 (84), Mar. 1952, p. 439-442

15 references.

11061* Synthesis and Properties of Some Isomers, Homologs, and Analogs of α-Terpineol Based on 1,3-Diene Hydrocarbons. (Russian.) A. A. Petrov and N. P. Sopov. *Zhurnal Obshchei Khimii*, v. 22(84), Apr. 1952, p. 591-603.

21 references.

11062* Catalytic Condensation of Alcohols With Ketones. I. Condensation of Methanol With Acetone. II. Condensation of Methanol With Methylethyl Ketone, Ethanol With Acetone, and Acetone With Acetylacetone. (Russian.) B. N. Dolgov and I. N. Samsonova. *Zhurnal Obshchei Khimii*, v. 22 (84), Apr. 1952, p. 637-640.

Miscellaneous Publications

11063 Stable Isotopes in Biochemical Research. D. Rittenberg and T. D. Price. "Annual Review of Nuclear Science". Vol. I. (Annual Reviews, Stanford, Calif.), p. 569-596. (QC780 An78)

177 references.

Books

11064 Medicinal Chemistry. 2 Vols. Alfred Burger, 1084 pages. 1951. Interscience Publishers, New York. (RS403 B91m)

An advanced treatise on chemistry, biochemistry, therapeutic, and pharmacological action of natural and synthetic drugs.

11065 Enzymes and Enzyme Systems; Their State in Nature. John T. Edsall, editor. 146 pages. 1951. Harvard University Press, Cambridge, Mass. (QP601 Ed76e)

Inaugurates a new series, Memoirs of the University Laboratory of Physical Chemistry Related to Medicine and Public Health of Harvard University. The first two chapters, by A. L. Lehninger and David E. Green, deal with behavior of enzymes within mitochondria. Emil L. Smith presents fundamental evidence for the importance of metallic ions in the action of enzymes. Andreas C. Maehly describes the splitting of an enzyme, peroxidase, into two component parts and its resynthesis from those parts. Britton Chance shows the quantitative interrelations of certain heme enzymes and demonstrates the extraordinary speed with which some of these reactions between large molecules can take place. The concluding chapter, by Edwin J. Cohn, Douglas M. Surgenor, and Margaret J. Hunter, discusses the state in nature of proteins and protein enzymes of blood and liver.

See also:
11011 (fluorescence and phosphorescence of organic compounds)

28. PLASTICS AND HIGH POLYMERS

11066* The Problem of Elastic Elongation of Polymers. (Russian.) E. I. Barg, D. M. Spitkovskii, and N. N. Mel'teva. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 11, 1952, p. 257-260.

Polyvinylacetate specimens with various molecular weights were tested in special equipment. Tables and graphs.

11067 Polyelectrolyte Behavior of Polyamides. II. Viscosities of Solutions of Linear and Multichain Polyamides in Formic Acid. John R. Schaefgen and Charles F. Trivisonno. *Journal of the American Chemical Society*, v. 74, June 5, 1952, p. 2715-2717.

11068 Molecular Size Distribution in Three Dimensional Polymers. VI. Branched Polymers Containing A-R-B_{f-1} Type Units. Paul J. Flory. *Journal of the American Chemical Society*, v. 74, June 1952, p. 2718-2723.

11069* Electric Control of Air-Flow Porosity in Plastic Sheet Materials. J. J. Suran. *Transactions of the American Society of Mechanical Engineers*, v. 74, Jan. 1952, p. 23-28; disc., p. 28-29.

Describes process which consists of passing electric sparks through the sheet material in such a manner as to produce a desired distribution of holes, and holes of a specified size. Deals specifically with air flow through plastic sheet materials.

11070* Effect of Orientation on the Mechanical Properties of Polystyrene. R. G. Cheatham and A. G. H. Dietz. *Transactions of the American Society of Mechanical Engineers*, v. 74, Jan. 1952, p. 31-40.

Extruded polystyrene rod was first annealed, then stretched hot to elongations as high as 12,000%. Tests were made in tension, flexure, and torsion at 0-80°C. 12 ref.

11071* Effect of Adsorbed Water on Physical Properties of Phenolic Plastics. H. M. Quackenbos, Jr., and J. M. Hill. *Transactions of the American Society of Mechanical Engineers*, v. 74, Jan. 1952, p. 41-50.

Adsorption of water by phenolic plastics obeys Fick's law and can be described completely by a saturation constant, a diffusion constant, and a simple relation between diffusion constant and temperature. Effects on mechanical and dimensional properties are discussed.

11072* Determination of Fusion Point, Drop Point, Breaking Point, Penetration, and Ductility. (German.) Ludwiga Hofmann. *Archiv für technisches Messen*, June 1952, p. 131-136.

Describes various German standard methods for determination of the above properties of bitumen, tar, and resin. Table compares the various methods for determination of fusion point. Diagrams show various devices used.

11073 Plastics and the Honeycomb Structure. George May. *British Plastics*, v. 25, June 1952, p. 201-205.

Survey of honeycomb development with illustrations of typical applications and discussion of laminating technique. Photographs. 11 ref.

11074 Developments in Glass Reinforced Plastics. *British Plastics*, v. 25, June 1952, p. 206-207, 216a.

Summaries of papers presented at a convention at Ashorne Hill, Leamington, England, organized by Fiberglass, Ltd.

11075* Plastic Patching For Steel Piping. Thomas W. McConville. *Bureau of Ships Journal*, v. 1, June 1952, p. 15-17.

Navy foresees many uses in making emergency repairs of battle damage. A ruptured water main was repaired in approximately 30 min., and the patch was strong enough to withstand a pressure of 300 lbs. Illustrated.

11076 Normal and Cross-Linked Polystyrene. J. A. Manson and L. H. Cragg. *Canadian Journal of Chemistry*, v. 30, June 1952, p. 482-496.

Polystyrene polymerized in emulsion at 55°C. to near-complete conversion was subjected to careful primary, secondary, and tertiary fractionation. Intrinsic viscosity and slope constants were determined at 25°C. in butanone and benzene. Samples of cross-linked polystyrene were prepared. Values of K′ were determined for the soluble cross-linked species, both unfractionated and fractionated. Tables and graphs. 37 ref.

11077 Fluorine Plastics. *Chemical and Engineering News*, v. 30, June 30, 1952, p. 2688-2691.

Staff report on properties and applications.

11078 Liquid-Phase Reactions at High Pressures. Part VII. The Polymerisation of 1:2-Dichloroethylene. K. E. Weale. *Journal of the Chemical Society*, June 1952, p. 2223-2224.

The peroxide-catalyzed polymerization of trans-1,2-dichloroethylene was examined at pressures up to 8000 atm. High pressures favor formation of polymers higher than dimer, and increase the yield of insoluble solid polymer.

11079 The Kinetics of Catalytic Polymerizations. Part III. The Kinetics and Mechanism of the Polymerization of α-Methylstyrene Catalyzed by Aluminium Chloride. Part IV. Molecular-Weight Distribution in Polar Polymerizations. Part V. The Molecular-Weight Distribution of Poly- (α-Methylstyrene) Prepared by the Aluminium Chloride-Catalyzed Polymerization. D. O. Jordan and A. R. Mathieson. *Journal of the Chemical Society*, p. 2354-2366.

11080* Polymerization. II. Photopolymerization of Biphenyl Ethylene. (German.) Hans Heinrich Schulbach and Almuth Faltings. *Chemische Berichte*, v. 85, no. 6, 1952, p. 514-520.

Shows that halide-free biphenyl ethylene is not polymerized by light in the absence of oxygen and that it easily forms with oxygen an active peroxide which may either polymerize by itself or else form, with excess biphenyl ethylene, a mixed polymer. Biphenylene peroxide was found to retard polymerization of styrene. Tables and graphs.

11081* Solubility and Identification of Macromolecular Substances. (German.) A. Gordijenko. *Chemische Technik*, v. 4, Jan. 1952, p. 34-38; Feb. 1952, p. 89-94.

Describes and compares new methods of identifying the above, especially on the basis of their behavior in solvents. Tables and graphs.

11082* Testing Method for Determining the Tensile Strength and Fracture Elongation of Tubes and Plates of Hard Polyvinyl Chloride Plastic. (German.) H. Jungnickel. *Chemische Technik*, v. 4, Feb. 1952, p. 86-89.

Gives details of Krannich's method for the above. Includes tables, graphs, diagrams, and photographs.

11083* Some Observations on the Stability of Polyvinyl Chloride. K. Thinius. *Chemische Technik*, v. 4, Feb. 1952, p. 81-86.

Results of studies under different conditions prove that the thermal stability of polyvinyl chloride foils, heat-treated for an extended time at rolling temperature, can be determined by solubility investigations. Tables and graphs.

11084* The Relation Between the Huggins Slope Constant K′ and Intrinsic Viscosity, and the So-Called "True" Intrinsic Viscosity. L. H. Cragg. *Chemistry & Industry*, June 28, 1952, p. 623-624.

Theoretical discussion of recent literature on the above as applied to polymer-solvent systems. 12 ref.

11085* The Solvation of Polyvinyl Chloride by Various Organic Molecules. (French.) Pierre Terra and René A. Paris. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 234, May 26, 1952, p. 2191-2193.

The above was studied with binary liquids having a dissolving effect on the polymer, and with pure vapors of various ketones. Results are tabulated.

11086* Vinyl-Silicone Resin Treatment of Glass Fibers. *Electrical Manufacturing*, v. 50, July 1952, p. 232, 234, 236.

Method described is said to eliminate the large loss in flexural strength of glass fiber-polyester laminates caused by water.

11087* Diffusion-Controlled Reactions During the Bulk Polymerization of Styrene. M. F. Vaughan. *Transactions of the Faraday Society*, v. 48, June 1952, p. 576-579.

Using an equation suggested by Rabinowitch, some calculations were made which indicate that, during the thermal polymerization of styrene at 125°C., termination, propagation, and possibly transfer reactions may become diffusion-controlled. Further calculations using an equation suggested by Spencer and Williams show a rough correlation between these predictions and the observed phenomena. 15 ref.

11088 Nylon for Bearings and Gears. Robert Lurie. *General Electric Review*, v. 55, July 1952, p. 34-35, 61.

Discusses physical and mechanical properties, results of wear tests, design, and application.

11089 Injection Molding Heavy Sections of Polystyrene. Gordon B. Thayer. *India Rubber World*, v. 126, June 1952, p. 375-380.

Discusses difficulties encountered. Gives details of recommended equipment and procedures. Detailed drawings. 18 ref.

11090 Highly Cross-Linked Polybutadiene; Preparation and Mechanical Behavior. John A. Coffman. *Industrial and Engineering Chemistry*, v. 44, June 1952, p. 1421-1428.

Cross-linked polybutadiene proved to be a heat-resistant, solvent-resistant, dimensionally stable material. Its electrical characteristics are equivalent to those of other hydrocarbon polymers, such as polyethylene and polystyrene. However, certain factors in its preparation make it seem unlikely that the resin will have more than limited commercial utilization. Several points of general theoretical interest in the field of polymer structure were encountered.

11091 Cast Plastics from 2-Furaldehyde. O. R. Sweeney, L. K. Arnold, and J. T. Long. *Industrial and Engineering Chemistry*, v. 44, July 1952, p. 1582-1586.

Describes experimental work on the above. Physical properties are given in tables and graphs. 21 ref.

11092 Isophthalic Acid; Application in Condensation Polymers. F. G. Lum and E. F. Carlston. *Industrial and Engineering Chemistry*, v. 44, July 1952, p. 1595-1600.

Discusses the use of isophthalic acid in drying oil-modified alkyd resins. Many comparisons with phthalic anhydride and terephthalic acid are made. Graphs and tables.

11093 Catalyzed Polymerization of Monoalkylethylenes; Promoted Aluminum Bromide Catalyst. C. M. Fontana, G. A. Kidder, and R. J. Herold. *Industrial and Engineering Chemistry*, v. 44, July 1952, p. 1688-1695.

Describes means of producing polymers of relatively high molecular weight from readily available olefins such as propylene and 1-butene. Numerous graphs and tables. 11 ref.

11094 400,000 Miles Per Pound. *Industrial and Engineering Chemistry*, v. 44, June 1952, p. 13A, 15A.

Naval Research Laboratory development of equipment for producing superfine plastic fibers for use in filtration of aersols. Schematic diagram.

11095 The Place of Plastics in the Order of Matter. J. J. P. Staudinger. *Journal of the Institute of Metals*, v. 80, June 1952, p. 529-536.

42nd annual May lecture. Describes nature of plastics and of their properties. Gives various fields of application in which plastics are replacing metals. Some composite metal-plastic articles are mentioned. Compares chemical and metallic bonds.

11096* Melt Viscosity and Flow Mechanism of Homologous Polyethylene. (German.) K. Ueberreiter and H. J. Orthmann. *Kolloid Zeitschrift*, v. 126, May 1952, p. 140-149.

Describes method of investigation. Data charted and tabulated. 26 ref.

28. *Plastics and High Polymers*

11097* Determining the Molecular Weights of Polyvinyl Chlorides. (German.) J. W. Breitenbach, E. L. Forster, and A. J. Renner. *Kolloid Zeitschrift*, v. 127, June 1952, p. 1-7.

Shows that molecular weights can be determined from the osmotic pressure of solutions of above and from their basic viscosities. Methods of determining osmotic pressure and basic viscosity are described. Tables, graphs, and nomograms. 14 ref.

11098* Size and Shape of Channels and Gates in Injection Molding. (German.) Hans Gastrow. *Kunstoffe*, v. 42, May 1952, p. 139-141.

Describes experiments which can serve as a basis for calculation of the above. The experimental die permits determination of flow resistance of the internal channel walls. Details of the calculation are indicated. Drawings.

11099* Determination of the Plasticizing Capacity of Polyvinylchloride Within the Temperature Range 100-160°C., by Means of the "Brabender Plastograph". (German.) Paul Schmidt. *Kunststoffe*, v. 42, May 1952, p. 142-148.

Describes development of apparatus and procedure for the above. Data are tabulated and charted.

11100* Increase of Volume of Rubber Mixtures and the Specific Weight of Porous Vulcanizates. (Russian.) V. I. Pimenov. *Legkaia Promyshlennost*, v. 12, May 1952, p. 28-30.

Measurements were made on the specific weight of expanded rubbers and coefficients of expansion were calculated. Tables and graphs.

11101 New Potting Compound Has Controlled Shrinkage. *Materials & Methods*, v. 35, June 1952, p. 117-118.

Describes new potting compound, Polyform, used to seal and embed electrical and electronic components. Gives general characteristics, advantages and properties, forms and applications. Typical units are illustrated.

11102* Resin Adhesives. Earl C. Lenz and Raymond Stone. *Modern Packaging*, v. 25, June 1952, p. 94-97, 180, 182.

A layman's review of special properties of above new category of packaging adhesives. Typical applications.

11103 Here Come the Copolymers. *Modern Plastics*, v. 29, July 1952, p. 71-78, 183.

1st article of series on economics of plastics-sheet forming deals with styrene copolymer sheets. Discusses applications and production techniques. Numerous photographs.

11104 Production of Large Polyethylene Carboys. Enrico Crosio. *Modern Plastics*, v. 29, July 1952, p. 101-103, 106.

Describes manufacture and use of 14 gal. carboys for shipment of corrosive or costly liquids.

11105 Heat-Resistant Copolymer of Triallyl Cyanurate and a Maleic Alkyd. Paul M. Elliott. *Modern Plastics*, v. 29, July 1952, p. 113-114, 185-187.

Describes properties of a low-pressure laminating resin with superior heat resistance, developed by Wright Air Development Center. Graphs and tables.

11106 Polyester Resins for Strength Retention at 500°F. H. M. Day and D. G. Patterson. *Modern Plastics*, v. 29, July 1952, p. 116, 120, 122.

Describes polymerized triallyl cyanurate which was found to have a very high heat distortion point and good stability at 500°F.

11107 Vinyl Silane Size for Glass Fabric. Johan Bjorksten and L. L. Yaeger. *Modern Plastics*, v. 29, July 1952, p. 124, 188.

Discusses necessity for improved wet-strength retention of glass-fabric-base polyester-resin laminates. Objective of Wright Air Development Center experiments was to obtain a finish which would produce glass-fabric laminates with better properties than can be obtained with 114-sized fabric. Results summarized.

11108 Finish 136 for High Wet Strength Laminates. C. E. Bacon. *Modern Plastics*, v. 29, July 1952, p. 126.

Considers the need for better water-resistant adhesion between glass and resin in laminates. Tells how the desired strength properties can be attained using above finish with several polyester resins. Graphs and tables.

11109 Morphology of Crystallizing Polymers. A. Keller. *Nature*, v. 169, May 31, 1952, p. 913-914.

In reference to above, summarizes a study of certain structural units—spherulitic in nature—of definite physical individuality and of submicroscopic and microscopic dimensions. Most work was done on polyethylene terephthalate. Micrographs.

11110 Some Aspects of Vinyl Polymerization in Heterogeneous Systems. C. H. Bamford, W. G. Barb, and A. D. Jenkins. *Nature*, v. 169, June 21, 1952, p. 1044-1046.

Reactions studied include the polymerization of acrylonitrile and the copolymerization of styrene and maleic anhydride. Includes a brief investigation of the polymerization of vinylidene chloride.

11111 Paper Chromatography of Natural Resins. J. S. Mills and A. E. A. Werner. *Nature*, v. 169, June 21, 1952, p. 1064.

Deals with the application of paper partition chromatography to the identification of natural resins and the separation of the constituents present, with particular reference to dammar and mastic.

11112* Plastics-Bonded Carpets. George May. *Plastics*, v. 17, June 1952, p. 174-177.

Experiences in the development of the above for production of true pile carpets. Photographs.

11113* Technique and Design of Pin-Point Gating with Injection Moulds. II. W. M. Halliday. *Plastics*, v. 17, June 1952, p. 185-186.

In Part II, further consideration is given to conventional gate and runner design forms and requirements, to give a comparative basis for appreciation of the design factors involved with pin-point gating. (To be continued.)

11114 Engineering Potential of Polyethylene. Henry Lee. *Product Engineering*, v. 23, July 1952, p. 168-173.

Covers mechanical, electrical, and gasketing properties and fabrication of above plastic. Graphs, tables, and photographs.

11115 "Teflon" Tetrafluoroethylene Resin as a Wire and Cable Insulator. Bertren E. Ely. *Wire and Wire Products*, v. 27, June 1952, p. 579-582.

Describes properties of the above and equipment and procedures for its application to wire. Diagrams.

11116* New Synthetics Based on Desmophen and Desmodur. (German.) P. Hoppe. *Zeitschrift des Vereines Deutscher Ingenieure*, v. 94, June 1, 1952, p. 484-487.

Shows that combination of above plastics in certain ratios and mixtures with fillers, pigments, etc., gives a series of highly useful products ranging from highly elastic and wear-resistant "rubbers" to very fine "foams", impregnating substances, adhesives, binders, lacquers, and plastics with a wide variety of properties and uses. Tables, photographs, and references.

Miscellaneous Publications

11117 Report of Committee D-9 on Electrical Insulating Materials. American Society for Testing Materials, Preprint 38, 1952, 35 pages. (TA401 Am35p)

Recommended revisions of standards, specifications, and test methods. Includes cellulose acetate sheet and film for primary insulation, testing of askarels, and tests for electrical resistance.

11118 Report of Committee D-20 on Plastics. American Society for Testing Materials, Preprint 49, 1952, 24 pages. (TA401 Am35p)

Recommended revisions in standards, specifications, and test methods. Includes measurement of flow of plastics, test of resistance of plastics to chemical attack, specifications for ethyl cellulose molding compounds, and definitions of terms.

11119 Nondestructive Determination of Mechanical Properties and Deterioriation of Adhesives. Albert G. H. Dietz, Herman N. Bockstruck, and George Epstein. American Society

for Testing Materials, Preprint 134, 1952, 14 pages. (TA401 Am35p)

Gives details of experimental work done at MIT for U. S. Army Ordnance. Emphasis is on non-biological factors leading to deterioration of such adhesives, particularly in metal-to-metal bonds. Two types of adhesives were tested in joining of Al-alloy and stainless-steel rods. Apparatus described and illustrated; results charted, tabulated, and discussed.

11120 The Effects of Molding Conditions Upon the Permanence of Plastics. J. L. Williams and J. W. Mighton. American Society for Testing Materials, Preprint 139, 1952, 15 pages. (TA401 Am35p)

Discusses basic factors affecting permanence of plastics, factors causing failure of plastics, effects of molding variables on physical properties, etc. Tables, graphs, and photographs.

11121 Properties of Exposed and Unexposed Polyvinyl Butyral Coated Fabrics. Meyer I. Landsberg, Thomas J. DiFilippo, and Ladislav Boor. *American Society for Testing Materials, Proceedings*, v. 51, 1951, p. 1262-1276; disc., p. 1276. (TA401 Am35p)

A series of polyvinyl butyral resins, plasticized with varying amounts of approximately equal parts of trioctyl phosphate and dibutyl "cellosolve" sebacate, were evaluated both as thick slabs and when coated on nylon. These materials were evaluated for their physical properties in the original and exposed states and for plasticizer and phosphorus content. Data are presented to show effect of Florida exposure on such properties as tearing strength and flexibility.

11122 Creep Relaxation Relations for Styrene and Acrylic Plastics. Joseph Marin and Yoh-Han Pao. *American Society for Testing Materials, Proceedings*, v. 51, 1951, p. 1277-1293; disc., p. 1294-1295. (TA401 Am35p)

Gives tension creep relaxation test results for styrene and acrylic plastics. Stress-time relaxation curves are presented for various initial stress values. Theoretical stress-time relations for the relaxation condition were predicted using various theoretical interpretations. For times greater than about 800 hrs., a simpler approximate method of interpretation called the "intercept method" gave good agreement with the actual creep-relaxation data.

11123 Effect of Temperatures From —70° to 600°F. on Strength of Adhesive-Bonded Lap Shear Specimens of Clad 24S-T3 Aluminum Alloy and of Cotton- and Glass-Fabric Plastic Laminates. H. W. Eickner, W. Z. Olson, and R. F. Blomquist. National Advisory Committee for Aeronautics, Technical Note 2717, June 1952, 26 pages. (TL570 Un3t)

Performance of 14 commercial adhesives under above conditions was evaluated, also that of 7 commercial adhesives at −70 to 250°F., in lap joints of cotton-fabric-phenolic laminate to itself, of glass-fabric-polyester laminate to itself, and in joints of each of these laminates to clad Al. Experimental set-up diagrammed; data tabulated.

Books

11124 Polyvinylchlorid und Vinylchlorid-Mischpolymerisate. (Polyvinyl Chloride and Vinyl Chloride Copolymers.) Franz Krainer. 698 pages. 1951. Springer-Verlag, Berlin, Germany. (TP986 K12p)

Comprehensive review of literature and patents on above. Deals with production, treatment, processing, chemical composition, properties, and uses in almost every important industry. Tables, diagrams, photographs, graphs, and numerous references.

11125 Poymerisations-Kinetik. (Kineties of Polymerization.) L. Küchler. 287 pages. 1951. Springer-Verlag, Berlin, Germany. (QD281.P6 K65p)

A concise but comprehensive treatise on above. Covers macromolecular compounds, experimental methods, and formal kinetic treatment of polymerization reactions, polymerizations with radical and ion mechanisms, definition of polycondensation reactions, and linear and 3-dimensional polycondensates. Tables, graphs, and chapter bibliographies.

See also:

10242 (physical properties of plastics, rubbers, and metals)
10411 (plasticizer determination in cellulose acetates)
10516 (gas permeability of plastic films)
10807 (synthetic resins for printing inks)
10884 (resins in paper technology)
10938 (gas permeability of plastic membranes)
11040 (resins from phenol and formaldehyde)
11165 (synthetic lacquer resins—book)
11366 (plastic scintillation phosphors)
11409 (new phenolic laminates)
11415 (plastic electrical-insulation developments)
11503 (rubber printing plates)
11517 (price volume ratios: plastics and metals)

29. RUBBERS AND OTHER ELASTOMERS

11126 Some Effects of Solid Fillers in Rubbers. *India Rubber World*, v. 126, June 1952, p. 359-363.

Discusses effect of particle size and shape; distribution of pigments within the matrix; adsorption of rubber by pigments; and concept of organized rubber on the basis of data from the literature and from new experimental work. Graphs and electron micrographs. 13 ref.

11127 Low Temperature Behavior of Silicone and Organic Rubbers. K. E. Polmanteer, P. C. Servais ,and G. M. Konkle. *Industrial and Engineering Chemistry*, v. 44, July 1952, p. 1576-1581.

Reports on 2 types of silicone rubber stocks: Type I that crystallizes at about −76°F. and Type II at −112°F. Type I is exemplified by Silastic 160 and Type II by Silastic 250 and 6-160. Describes briefly the special apparatus used in obtaining stress-strain curves at temperatures down to −130°F. or below. Data obtained are compared with those for natural rubber and GR-S determined on the same apparatus. Graphs, diagrams, and tables. 10 ref.

11128 Electrical Analog Method for Studying Elastomer Behavior. R. B. Stambaugh. *Industrial and Engineering Chemistry*, v. 44, July 1952, p. 1590-1594.

Discusses above device, giving circuit diagrams.

11129 Butadiene-Methacrylic Acid Copolymers as Rubber-to-Steel Adhesives. Charles E. Fran, Gerad Kraus, and Albert J. Haefner. *Industrial and Engineering Chemistry*, v. 44, July 1952, p. 1600-1603.

Considers preparation and properties of the above. 16 ref.

11130 Ultimate and Actual Tensile Strengths of Latex Films. S. H. Maron, B. P. Madow, and J. C. Trinastic. *Industrial and Engineering Chemistry*, v. 44, July 1952, p. 1633-1634.

Presents data for a study made on 10 GR-S Type V, 8 X-370, and 10 natural-rubber latex samples. Physical properties are tabulated.

11131 Ethyl Maleopimaric Soap as Emulsifier for GR-S Polymerization. F. L. McKennon and R. V. Lawrence. *Industrial and Engineering Chemistry*, v. 44, July 1952, p. 1662-1664.

Study was undertaken in order to evaluate the polymer formed when sodium ethylmaleopimarate is substituted for the disproportionated rosin soap in the GR-S-10 recipe. Tables. 16 ref.

11132 Electron Microscope Study of Plasticized Latices. E. B. Bradford. *Journal of Applied Physics*, v. 23, June 1952, p. 609-612.

In relation to synthetic-latex formulation and film formation the article pictures, by use of a replica technique, the individual particles as they actually appear in the surface of films cast from latices before and after they have been plasticized. Electron micrographs.

11133* Sorption of GR-S Type of Polymer on Carbon Black. III. Sorption by Commercial Blacks. I. M. Kolthoff and R. G. Gutmacher. *Journal of Physical Chemistry*, v. 56, June 1952, p. 740-745.

Sorption capacities toward GR-S rubber of 5 commercial carbon blacks are given and discussed. Tables and graphs. 16 ref.

11134 Apparatus for the Measurement of the Dynamic Shear Modulus and Hysteresis of Rubber at Low Frequencies. W. P. Fletcher and A. N. Gent. *Journal of Scientific Instruments*, v. 29, June 1952, p. 186-188.

Includes typical results. Graphs, and circuit, and other diagrams.

29. *Rubbers and Other Elastomers*

11135* New Methods of Investigation for Rubber Fillers. (German). H. D. Krug. *Kautschuk und Gummi*, v. 5, May 1952, p. WT72-WT76.

Describes two new methods for the above, one a complete deformation examination, the other one characterized by measurement of relative dielectric-loss angle. Data are extensively charted.

11136* Rational Method of Formulating Rubber Soles. (Russian.) V. A. Mikhailov and I. M. Landa. *Legkaia Promyshlennost*, v. 12, Mar. 1952, p. 15-17.

Discusses various ways of obtaining desired properties in rubber compounds for shoe soles. 13 ref.

11137 The Growth of Bacteria on Natural Rubber. (Russian.) V. N. Shaposhnikov, I. L. Rabotnova, G. A. Iarmola, V. M. Kuznetsova, and N. N. Mozokhina-Porskniakova. *Mikrobiologiia*, v. 21, Mar.-Apr. 1952, p. 146-154.

The influence of various factors on the decomposition of natural rubber by bacteria were studied. Data are tabulated. 11 ref.

11138* Heats of Copolymerization of Butadiene and Styrene from Measurements of Heats of Combustion. Raymond A. Nelson, Ralph S. Jessup, and Donald E. Roberts. *Journal of Research of the National Bureau of Standards*, v. 48, Apr. 1952, p. 275-280.

22 references.

11139* Xetal 50 and Its Industrial Applications. (French.) Emmanuel Valtier. *Revue Générale du Caoutchouc*, v. 29, June 1952, p. 398-405.

Deals with a natural-rubber latex product manufactured in France. It contains 50% rubber and can be stored for several months. Varied applications in treating of textiles, paper, asbestos, glass, leather, etc., are surveyed.

11140* Improvement of the Adherence of Bicycle or Automobile Tire Cord to Synthetic Rubber. (French.) *Revue Générale du Caoutchouc*, v. 29, June 1952, p. 409-414.

Durability of tires depends largely on good cord-rubber adherence. Methods previously suggested for its improvement are discussed. Use of aromatic diamines was found to give good results. Marked difference among the 3 isomers of phenylenediamine was noted.

11141 Applications of the Stacomizer Press in Various Stages of Rubber Processing. J. D. Keane and F. W. Bickel. *Rubber Age*, v. 71, June 1952, p. 349-351.

Preliminary findings in the use of above press for dewatering, working, and compounding. 19 ref.

11142 Cottonseed Meal as a Tire Cord-to-Rubber Adhesive. Wade H. Hoffman, Jr., and Jett C. Arthur, Jr. *Rubber Age*, v. 71, June 1952, p. 354-356.

Evaluates solvent-extracted cottonseed meal, a product containing more than 50% protein, as an adhesive for bonding cotton and rayon tire cord to rubber. Apparatus diagrams and tables.

11143 Compounding Reclaim with New Elastomers for High Quality at Low Cost. M. F. Torrence and H. G. Schwartz. *Rubber Age*, v. 71, June 1952, p. 357-360.

A study of the effects of blending natural rubber, GR-S(LTP), and Neoprene Type GN-A with whole tire reclaim. Tables and graphs.

11144 Compounding Neoprene W with Fine Particle Silica. Ralph F. Wolf and F. W. Gage. *Rubber Age*, v. 71, June 1952, p. 365-366.

A study of above with tabular results showing effects for different types of acceleration and for high-styrene resins.

11145* Modification of Natural Rubber by Synthetic Polymers. G. F. Bloomfield. *Rubber Developments*, v. 5, Summer 1952, p. 34-38.

A general review.

11146* Cyclized Rubber; Its Development and Applications. C. M. Blow. *Rubber Developments*, v. 5, Summer 1952, p. 44-47 .

11147* Water Vapour Permeable Natural Rubber Proofed Fabrics. C. M. Blow and M. Pike. *Rubber Developments*, v. 5, Summer 1952, p. 60-64.

Describes work of British Rubber Producers' Research Assn. in development of the above. Compositions are tabulated; test procedures for water-vapor transmission are described. 12 ref.

Miscellaneous Publications

11148 Report of Committee D-11 on Rubber and Rubber-Like Materials. American Society for Testing Materials, Preprint 40, 1952, 18 pages. (TA401 Am35p)

Recommended revisions of standards, specifications, and test procedures.

Books

11149 Obshchaia Tekhnologiia Reziny. (General Technology of Rubber.) (Russian.) G. I. Glazunov. 224 pages. 1949. State Scientific-Technical Publishing House of Chemical Literature, Leningrad and Moscow, U. S. S. R. (TS1890 G460)

This textbook describes basic properties of rubber mixtures and methods of producing various rubber articles.

See also:
10242 (physical properties of plastics, rubbers, and metals)
11257 (growth of rubber plants in temperate zone)
11503 (rubber printing plates)

30. PAINTS, VARNISHES, LACQUERS, AND ENAMELS

11150* The Chemistry of Polymerized Oils. I. Characteristics of Some Pilchard Stand Oil Fractions. F. J. Joubert and Donald A. Sutton. *Journal of the American Oil Chemists' Society*, v. 29, July 1952, p. 287-291.

Present-day knowledge of the composition and mode of formation of stand oils is briefly reviewed. One pilchard stand oil of low viscosity was separated by molecular distillation into nonpolymeric and polymeric triglycerides. The polymeric triglycerides were separated into 3 broad sub-fractions, number average molecular weights of which were determined by an isothermal distillation method. 33 ref.

11151 Nitrocellulose Aerosol Lacquers. H. G. Philips, Jr., and H. S. Lawton. *American Paint Journal*, v. 36, June 23, 1952, p. 66, 68, 70, 72.

Discusses above dealing with composition, formulation, atomization, packaging, and use.

11152 New Standard for Coating Thickness. Max Kronstein. *Chemical Engineering*, v. 59, June 1952, p. 201-203.

Advises that coating thickness should be 3 times the profile depth to resist moisture penetration. This conclusion reached after measuring the profile of grit-blasted steel surfaces and determining the effect of various thicknesses of organic coatings on moisture penetration. The electrographic printing method was used to detect moisture penetration and under-film spreading of moisture, and profiles were studied by a surface analyzer. Charts and electrographic prints.

11153 Economics of Industrial Maintenance Painting. Robert R. Pierce. *Corrosion* (Technical Section), v. 8, May 1952, p. 178-182.

Data are based on results of a continuing research program, initiated by the Corrosion Engineering Products Dept., Pennsylvania Salt Mfg. Co., to determine factors and materials which promote maximum protective life in chemical industrial painting. Determinations were conducted within 3 major chemical manufacturing plants, widely divergent geographically, in 14 different environments. Wire-brushed, corroded, and blasted surfaces were examined. Tables, graphs, and illustrations.

11154 Synthetic Resins for Industrial Finishes. Part III. Systems Containing No Drying Oil or Alkyd. William von Fischer. *Finish*, v. 9, July 1952, p. 29-32, 64-66.

11154a Zinc Dust as a Protective Pigment. A. Pass. *Journal of the Oil & Colour Chemists' Association*, v. 35, June 1952, p. 241-261.

Methods of preparation and physical, chemical, and pigmentary

properties of zinc dust are described. Reviews various paint formulations in which the pigment is used, including cementiferous paints based on inorganic binders. Theoretical considerations underlying the anti-corrosive properties of Zn dust paints are discussed, and attention drawn to different considerations applying to marine and atmospheric exposures. 16 ref.

11155 The Grinding and Dispersion of Titanium Pigments in Ball Mills. A. Bowman. *Journal of the Oil & Colour Chemists' Association*, v. 35, July 1952, p. 314-328.

Theory of incorporation of the pigment into paint media is discussed in terms of wetting, mechanical attrition, and true dispersion. Action of the ball mill is described and illustrations given of effect of ball size, time, viscosity, and rheological properties of the mill base on efficiency of grinding.

11156 Vinyl Dispersion-Organosols. E. M. Hayden. *Organic Finishing*, v. 13, June 1952, p. 13-18.

Reviews preparation, properties, manufacturing methods, and applications of the above, used as organic coatings. Graphs and diagrams.

11157 Paint Machinery Review. *Paint Manufacture*, v. 22, June 1952, p. 201-212, 217.

An illustrated survey of equipment and apparatus of special interest to the paint and allied industries.

11158 The Utilization of Norelac Resins in Protective Coatings. A. J. Lewis, L. B. Falkenburg, and J. C. Cowan. *Paint, Oil & Chemical Review*, v. 115, June 19, 1952, p. 13-14, 17.

Reports results of studies on durability tests made to determine the suitability of Norelac as a wood sealer, corrosion-resistant coating, and as a finish coating on wood and steel. Extensive tables.

11159* Electrophoretic Phenomena in Paints. *Paint, Oil & Chemical Review*, v. 115, July 3, 1952, p. 22. (Translated and condensed from article by K. Meier and H. Ladeburg, *Deutsche Farben Zt.*, v. 5, 1951, p. 414-419.)

In relation to the assumption that electrophoretic phenomena in pigmented systems are largely responsible for settling and other related paint defects, a study was made of a variety of pigmented materials in a strong electrical field.

11160* Isocyanates in the Varnish Industry. *Paint, Oil & Chemical Review*, v. 115, July 3, 1952, p. 22-23. (Translated and condensed from an article by F. Sjollema, *Verfkroniek*, v. 24, 1951, p. 302, 340.)

Concerns a summary of the use in Germany of isocyanates in the Desmodur-Desmophene systems, strengthened by extensive laboratory and exposure tests.

11161* Characteristics of Flatting Agents. Luther O. Young. *Paint and Varnish Production*, v. 42, June 1952, p. 17-20, 44.

Discusses above giving information on selection, usage, particle size, performance, settling, and economics—with special reference to synthetic silica. Tables and graphs.

11162* Development and Research in the Coatings Materials Industry. Part VI. Development Technics Applied to Varnish and Vehicle Production. Part VII. Development Technics for Paint and Enamel Formulation. Howard C. Woodruff. *Paint and Varnish Production*, v. 43, June 1952, p. 22-25, 65; July 1952, p. 21-24, 45.

11163* Corrosion. 5. The Protective Action of Paints. J. E. O. Mayne. *Research*, v. 5, June 1952, p. 278-283.

Discussion of how paint films inhibit corrosion by virtue of their high electrolytic resistance; the electrochemical theory of corrosion applied to the protective action of paints for iron and steel. 24 ref.

Miscellaneous Publications

11164 Report of Committee D-1 on Paint, Varnish, Lacquer, and Related Products. American Society for Testing Materials, Preprint 30, 1952, 39 pages. (TA401 Am35p)

Recommended changes in specifications and standards. Proposed test methods for flash point of volatile solvents, for pigment properties, for color of clear liquids, and for other aspects.

Books

11165 Lackkunstharze. (Synthetic Lacquer Resins.) Ed. 3. Hans Wagner, Hans Friedrich Sarx, Bernhard Cyriax, and Adolf Weihe. 255 pages. 1950. Carl Hanser Verlag, Munich, Germany. (TP938 W12L3)

Discusses the physical and chemical properties of synthetic resins, formation of resins by condensation and addition reactions; phenolic resins; alkyd resins and other polyesters; maleinate resins; vinyl resins, coumarone resins, modified natural polymers, silicone resins, and analytical methods. Illustrations, tables, and a bibliography.

See also:
10318 (coatings for Al flasks for wine)
10815 (SCl_2 vapor process for drying coatings)

31. AGRICULTURAL RESEARCH

11166* Absorption and Translocation of Insecticides by Plants. J. E. Casida and T. C. Allen. *Agricultural Chemicals*, v. 7, June 1952, p. 41-43, 135, 137.

Discusses translocation of toxicity in plants from insecticide residue and the problems arising from this phenomenon. Considers insecticides of the following general types: oils, inorganics, natural botanicals, and synthetic organics.

11167* Results of Field Tests on Use of Ryania Insecticide in Corn Borer Control. Donald F. Starr, John T. Schulz, and Paul Ferguson. *Agricultural Chemicals*, v. 7, June 1952, p. 46-47, 135.

Above results discussed and tabulated.

11168* Controlling Tobacco Sucker Growth with Maleic Hydrazide. E. L. Petersen. *Agronomy Journal*, v. 44, June 1952, p. 332-334.

A study of the above for several concentrations of 3 salts of maleic hydrazide, with data given also on yields and quality. Tables.

11169 The Action of Microelements on the Yield of Alfalfa on Black Soils. (Russian.) A. G. Silin. *Doklady Akademii Nauk SSSR*, new ser., v. 83, Mar. 21, 1952, p. 493-496.

Experiments were conducted on the influence of small amounts of $CaSO_4$, $MnSO_4$, H_3BO_3, $MgSO_4$, and $(NH_4)_6Mo_7O_{24}$ on the above. Data are tabulated.

11170* Pre-Sowing Moistening of Seeds in Copper Sulfate Solutions as a Means of Satisfying the Copper Requirements of the Plant. (Russian.) S. N. Drozdov. *Doklady Akademii Nauk SSSR*, new ser., v. 83, Apr. 21, 1952, p. 929-930.

Buckwheat, corn, and red-clover seeds were treated with $CuSO_4$ before planting. Yield data are tabulated. 12 ref.

11171* Destruction of Root-Sprouts of Weeds By Use of 2,4-D Herbicide. (Russian.) A. V. Voevodin. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 1, 1952, p. 113-116.

2,4-D was applied for 2 years for control of thistles and bindweed. Data are tabulated.

11172* Influence of 2,4-Dichlorphenoxyacetic Acid on the Exchange of Substances by Sunflowers at Various Temperatures. (Russian.) I. I. Gunar, E. E. Krastina, and K. A. Briushkova. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 1, 1952, p. 173-176.

Laboratory tests were made on action of 2,4-D on the chemical composition of sunflower tissues as a function of temperature. Data are tabulated. 14 ref.

11173* The Influence of Heteroauxin on Above-Ground Growth and Yield of Potatoes. (Russian.) P. F. Medvedev. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 11, 1952, p. 365-368.

An aqueous solution of 0.005% heteroauxin was used as a growth stimulant in tests made on several varieties of potatoes. Data are tabulated.

11174* The Character of the Utilization of Radiant Energy by Tomato Plants in Dependence on Strength of the Radiation and Duration of Daily Illumination. (Russian.) B. S. Moshkov. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 11, 1952, p. 369-372.

31. *Agricultural Research*

11175* Change of the Activity of Certain Insects During Poisoning by Benzenehexachloride and DDT. (Russian.) N. G. Berim. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 11, 1952, p. 393-396.

A study was made on the effects of BHC and DDT on the life processes of several insects. Data are tabulated. 10 ref.

11176* Antibiotics as Agents for the Control of Certain Damping-off Fungi. K. F. Gregory, O. N. Allen, A. J. Riker, and W. H. Peterson. *American Journal of Botany*, v. 39, June 1952, p. 405-415.

Results of extensive experimental studies. Tables and graphs. 28 ref.

11177* A Critical Evaluation of Available Agricultural Statistics. Ivan M. Lee. *Journal of the American Statistical Association*, v. 47, June 1952, p. 267-280.

11178* Lime and Molybdenum in Clover Development on Acid Soils. A. J. Anderson and D. V. Moye. *Australian Journal of Agricultural Research*, v. 3, Apr. 1952, p. 95-110.

In a study of the above, it was found that responses equal to those obtained with heavy dressings of lime can be obtained by applications of Mo together with only 200 lbs. of lime per acre at seeding. Marked response to Mo was obtained only where low levels of lime were used. Importance of treatment with adequate superphosphate in addition to lime and Mo is stressed. Interpretation and significance of positive and negative lime-Mo interactions are discussed. 18 ref.

11179* The Occurrence of Sulphur Deficiency on a Soil of Adequate Phosphorus Status. K. D. McLachlan. *Australian Journal of Agricultural Research*, v. 3, Apr. 1952, p. 125-127.

Subterranean clover grown on a basaltic soil responded markedly to treatment with sulfate. The sulfur deficiency was uncomplicated by deficiencies of other elements, including P.

11180* Role of Nitrogen and Water Conditions in the Formation and Accumulation of Ascorbic Acid by Tomatoes. (Russian.) E. M. Popovskaia. *Biokhimiia*, v. 17, Mar.-Apr. 1952, p. 145-153.

Extensive experiments were conducted on the above. Data are tabulated. 23 ref.

11181* Change of Ascorbic Acid Content in the Tubers and Above-Ground Parts of Potatoes During Various Conditions of Cultivation. (Russian.) G. Sh. Aslanian and T. T. Vartanian. *Biokhimiia*, v. 17, Mar.-Apr. 1952, p. 179-185.

Experimental data tabulated and discussed.

11182* The Atomization of Liquid in a Flat Spray. R. G. Dorman. *British Journal of Applied Physics*, v. 3, June 1952, p. 189-192.

In reference to agricultural spraying, a study was made by flash photography, of the mechanism of the atomization, and to determine the size-distribution of the droplets produced. The purpose was to relate parameters characterizing the distribution to physical properties of the liquid and the conditions of dispersion. Photographs and graphs.

11183 Synthesis of P^{32} Labeled Parathion. D. H. Murray and J. W. T. Spinks. *Canadian Journal of Chemistry*, v. 30, June 1952, p. 497.

Describes above, useful in insect toxicology studies.

11184 Cobalt in Ruminant Nutrition. J. E. Ford, S. K. Kon, and J. W. G. Porter. *Chemistry & Industry*, May 31, 1952, p. 495.

A brief review. 10 ref.

11185* Bacterial Disease of Wheat Caused by *Corynebacterium Tritici* (Hutchinson) Bergey *et al.* R. S. Vasudeva and M. K. Hingorani. *Phytopathology*, v. 42, June 1952, p. 291-293.

Illustrated.

11186* Effectiveness of Coarse Organic-Mineral Granules. (Russian.) E. Koliasev. *Doklady Vsesouiznoi Ordena Lenina Akademii Sel'skokhoziaistvennykh Nauk imeni V. I. Lenina*, v. 17, no. 1, 1952, p. 9-18.

Experiments were made on use of the above. Yields in low-moisture conditions were increased significantly. Better utilization of the mineral fertilizers by the plants also resulted.

11187* New Wetting Agents for Spraying Contact Insecticides and Acaricides. (Russian.) A. A. Smirova. *Doklady Vsesouiznoi Ordena Lenina Akademii Sel'skokhoziaistvennykh Nauk imeni V. I. Lenina*, v. 17, no. 2, 1952, p. 19-22.

Tests were made of a series of wetting agents to determine their suitability for the above. Data are tabulated.

11188* The Properties of Granulated Fertilizers. (Russian.) P. A. Baranov and M. V. Dankova. *Doklady Vsesouiznoi Ordena Lenina Akademii Sel'skokhoziaistvennykh Nauk imeni V. I. Lenina*, v. 17, no. 1, 1952, p. 3-8.

The influence of various times of adding granulated superphosphate to rye was investigated. Tables.

11189* Influence of Growing Conditions on Changes of the Technological Properties of the Stalks and Fibers of Hemp. (Russian.) B. V. Lesik. *Doklady Vsesouiznoi Ordena Lenina Akademii Sel'skokhoziaistvennykh Nauk imeni V. I. Lenina*, v. 17, no. 5, 1952, p. 9-14.

Tests were made on the influence of type of seeding (row or broadcast), fertilizing, and type of land on hemp fibers. Data are tabulated.

11190* Nourishment and Frost Resistance of Tangerines. (Russian.) N. P. Bedrikovskaia. *Doklady Vsesouiznoi Ordena Lenina Akademii Sel'skokhoziaistvennykh Nauk imeni V. I. Lenina*, v. 17, no. 4, 1952, p. 30-34.

Experiments were made on various times of applying nitrogen and phosphorus fertilizers to tangerine groves. Data are tabulated.

11191* The Action of Killer-Microbes and Antibiotic Substances Produced by Them on a Series of Bacteriosis Inducers for Farm Crops. (Russian.) R. O. Mirzabekian. *Doklady Vsesouiznoi Ordena Lenina Akademii Sel'skokhoziaistvennykh Nauk imeni V. I. Lenina*, v. 17, no. 5, 1952, p. 34-38.

A study was made of the above. Results are discussed as a possible method of applying antibiotics to rid trees of bacterial diseases.

11192* The Action of DDT and BHC on Bacteria. (Russian.) P. V. Sozonov and I. N. Fedorova. *Doklady Vsesouiznoi Ordena Lenina Akademii Sel'skokhoziaistvennykh Nauk imeni V. I. Lenina*, v. 17, no. 5, 1952, p. 39-41.

The influence of concentration and time of application of above insecticides on cultures of *Colstridium Felsineum* were determined. Data are tabulated.

11193* Poisoning of Plants by Organic Insecticides. (Russian.) E. N. Kozlova and E. I. Dvortsova. *Doklady Vsesouiznoi Ordena Lenina Akademii Sel'skokhoziaistvennykh Nauk imeni V. I. Lenina*, v. 17, no. 4, 1952, p. 41-48.

Experiments were made on the adsorption of DDT and other modern insecticides by plants. Tables and graphs.

11194* Seed Quality of Wheat After Drying the Grain by High-Frequency Current. (Russian.) N. V. Knipper. *Doklady Vsesouiznoi Ordena Lenina Akademii Sel'skokhoziaistvennykh Nauk imeni V. I. Lenina*, v. 17, no. 3, 1952, p. 52-55.

Tests were made on the above. Equipment is described. Data are tabulated.

11195* Chemical Examination of Plant Insecticides. Part VI. Root Bark of *Tephrosia lanceolata* Grah. S. Rangaswami and B. V. Rama Sastry. *Proceedings of the Indian Academy of Sciences*, v. 35, sec. A, Apr. 1952, p. 166-172.

11196* Soil Conditions as Affected by Tannery Waste Waters. C. R. Harihara Iyer, R. Rajagopalan, and S. C. Pillai. *Journal of the Indian Institute of Science*, v. 34, sec. A, Apr. 1952, p. 163-178.

Results of investigation show that above waste waters have been responsible for deterioration of the soil and for failure of crops year after year.

11197 Industrial Wastes. Harold R. Murdock. *Industrial and Engineering Chemistry*, v. 44, June 1952, p. 97A-99A.

Tells how chlorophyll-bearing planktons synthesize the soluble substances in natural water to produce complex animal food. Indicates potential, presently untapped, source of high-protein materials. Effects on abatement of industrial wastes is discussed.

11198 Industrial Hygiene. J. F. Morgan. *Industrial and Engineering Chemistry*, v. 44, June 1952, p. 111A-112A, 114A.

Health problems associated with new synthetic organic insecticides.

11199* The Effect of Amino Acids and Related Compounds Upon the Growth, Virulence, and Enzyme Activity of Crown Gall Bacteria. J. M. Van Lanen, A. J. Riker, and I. L. Baldwin. *Journal of Bacteriology*, v. 63, June 1952, p. 723-734.

11200* The Role of Enzymatic Oxygen Removal in Chemical Protection Against X-Ray Inactivation of Bacteria. G. E. Stapleton, Daniel Billen, and Alexander Hollaender. *Journal of Bacteriology*, v. 63, June 1952, p. 805-811.

Compounds found to be protective against the action of X-rays on bacterial cells are divided into two classes on the basis of whether or not preincubation with the cells is required for protection. Decrease in protective capacity is correlated with decrease in respiration rate of those compounds which require preincubation for protection. Data presented are consistent with the hypothesis that oxygen removal rather than hydrogen donation is the major mode of protection afforded by chemical protective agents. 12 ref.

11201* Antibacterial, Antifungal & Insecticidal Properties of Naphthalene & Its Derivatives. R. S. Baichwal and M. L. Khorana. *Journal of Scientific & Industrial Research*, v. 11A, May 1952, p. 197-201.

75 references.

11202* Antibacterial Properties of β-Naphthol Derivatives. Part I. Halogen Derivatives. R. S. Baichwal and M. L. Khorana. *Journal of Scientific & Industrial Research*, v. 11B, May 1952, p. 169-172.

16 halogen derivatives were examined for their antibacterial properties against *B. typhosus* and *Staph. aureus*. The antibacterial activity of β-naphthol derivatives is higher than the activity of the corresponding phenol derivatives in the presence of organic matter. 17 ref.

11203* Toxicity of Nickel—Accumulation of Nickel in Rats Fed on Nickel-Containing Diets & Its Elimination. S. S. Phatak and V. N. Patwardhan. *Journal of Scientific and Industrial Research*, v. 11B, May 1952, p. 173-176.

The general condition and growth of rats fed on Ni-containing diet for 16 mos. were comparable with those of rats fed on Ni-free diets.

11204* High Yield of Seed and Roots of Kok-Sagyz. (Russian.) A. Kirshchenia. *Kolkhoznoe Proizvodstvo*, v. 12, Mar. 1952, p. 60.

Discusses the above for crops grown on peat soil with mineral fertilization.

11205 Several Observations on "Green Bacteria". (Russian.) G. G. Vinberg and T. N. Sivko. *Mikrobiologiia*, v. 21, Mar.-Apr. 1952, p. 139-145.

The amount and nature of "green bacteria" in ponds was investigated. Data are tabulated. 12 ref.

11206 The Fixating of Atmospheric Nitrogen by *Granulobacter Pectinovorum and Bac. Felsineus*, Stimulators of Flax Soaking. (Russian.) V. A. Alekseev. *Mikrobiologiia*, v. 21, Mar.-Apr. 1952, p. 166-170.

Cultures of the above bacteria were grown in liquid and semiliquid media without nitrogen. Data are tabulated. 12 ref.

11207 The Production of Highly Active Anti-Fungus Serums. (Russian.) A. N. Mamontova. *Mikrobiologiia*, v. 21, Mar.-Apr. 1952, p. 200-204.

The reaction of animals to various antifungus serums was studied. Data are tabulated. 14 ref.

11208* Research on the Insecticidal Action of Organic Compounds. Report 5. The Action of Heterocyclic Compounds. (German.) Vinzenz Prey, Ferdinand Beran, and Helene Böhm. *Mitteilungen des Chemischen Forschungsinstitutes der Wirtschaft Österreichs*, v. 6, Apr. 1952, p. 28-30.

Brief discussion includes tabular data on 36 organic compounds suggested as insecticides.

11209 Differentiation of the Polygalacturonases of *Aspergillus Niger*. E. Schubert. *Nature*, v. 169, May 31, 1952, p. 931-932.

A study showing the existence of at least 4 different above-type enzymes. Graphs, tables, and diagram.

11210 Production of Organic Matter in the Sea. E. Steemann Nielsen. *Nature*, v. 169, June 7, 1952, p. 956-957.

Discusses recent estimates on above using the C-14 method. Considerable variation in the productivity of different ocean areas is evident.

11211 Fungi Inhibiting Growth of the Crown-Rot Disease Fungus *Sclerotium Delphinii* Welch. T. C. Joseph. *Nature*, v. 169, June 14, 1952, p. 1016-1017.

Describes experiments in which 3 out of 40 parasitic fungi tested were found to have a strong inhibitory effect *in vitro* upon above fungus.

11212* Poison Weeds or Pamper Crops? Wm. A. Albrecht. *New Agriculture*, v. 34, Spring 1952, p. 6-7.

Discusses new approach to weed control. Stresses high soil fertility as a preventive measure, rather than the usual drug-poisoning of weeds.

11213* Trace Elements in Livestock Nutrition. Norman S. Lundquist. *New Agriculture*, v. 34, Spring 1952, p. 13, 36.

Discusses trace elements plus several common elements and their relative importance. Points out the dangers of an excess. Considers S, K, Mg, I, Fe (with Cu), Mn, Co, Zn, and F.

11214* Carnation Mosaic Virus: Properties and Electron Microscopy. Ralph W. Ames and H. H. Thornberry. *Phytopathology*, v. 42, June 1952, p. 289-291.

11215* On the Origin of Diseases in Plants. John P. Hollis. *Plant Disease Reporter*, v. 36, June 15, 1952, p. 219-227.

Discussion of above together with a review of selected references. Diagram and table. 36 ref.

11216* The Uptake of Phosphorus by Bean Plants With Particular Reference to the Effects of Iron. O. Biddulph and C. G. Woodbridge. *Plant Physiology*, v. 27, July 1952, p. 431-444.

Results of investigation using the P^{32} isotope as tracer are charted and discussed. Methods are described. 15 ref.

11217* The Relation of Acids and Peroxides in Spray Oils to the Respiration of Sprayed Bean Leaves and the Development of Injury. C. M. Johnson and W. M. Hoskins. *Plant Physiology*, v. 27, July 1952, p. 507-525.

Highly refined petroleum oils, containing no aromatics, and oxidized oils prepared from neutral stocks, were used in phytotoxicity studies on bean leaves. Results are tabulated, charted, illustrated, and discussed. 27 ref.

11218* Inhibition of Growth by Benzene Hexachloride Isomers and Protective Effect of Glucose as Measured by Cell Counting Technique. H. T. Hopkins. *Plant Physiology*, v. 27, July, 1952, p. 526-540.

Results charted, tabulated, and discussed. 44 ref.

11219* A Critical Study of the Cobalt Chloride Method of Measuring Transpiration. L. F. Bailey, J. S. Rothacher, and W. H. Cummings. *Plant Physiology*, v. 27, July 1952, p. 563-574.

Gravimetric water loss from small potted plants was adopted as the standard of comparison for cobalt chloride determinations. Experiments were designed with particular attention to the requirements for adequate sampling and statistical evaluation of the results. Plants used were tobacco, geranium, tomato, black oak, and white oak. 13 ref.

31. *Agricultural Research*

11219a* Absorption and Translocation of Radioactive 2,4-Dichloro-5-Iodo^{131}-Phenoxyacetic Acid by Green Plants. Avery H. Gallup and Felix G. Gustafson. *Plant Physiology*, v. 27, July 1952, p. 603-612.

Plants investigated were: bean, corn, oats, wheat, sunflower, dandelion, and narrow-leaved plantain. It was found that above growth regulator is absorbed by all the species used; but that the monocotyledonous plants, oaks, wheat, and corn absorb it at a slower rate than the others.

11220* Growth Regulating Properties of Some Thiosemicarbazones. Robertson Pratt, Jean Dufrenoy, and Peter P. T. Sah. *Plant Physiology*, v. 27, July 1952, p. 622-625.

Tested on canes of Thompson seedless grapes using a technique described previously.

11221* Temperature Response of Fungi as a Straight Line Transformation. Morris Cohen and C. E. Yarwood. *Plant Physiology*, v. 27, July 1952, p. 634-638.

Attempts to develop a method of simplification for toxicological data. Graphs show advantages of the transformed scale developed on which temperature-growth data appear as straight lines. 16 ref.

11222* Effect of 2,4-Dichlorophenoxyacetic Acid on Proteolytic Activity of Red Kidney Bean Plants. Theodore L. Rebstock, Charles L. Hamner, Charles D. Ball, and Harold M. Sell. *Plant Physiology*, v. 27, July 1952, p. 639-643.

16 references.

11223* New Method and Apparatus for Investigation of Gas Exchange in Soils. (Russian.) I. A. Turliun. *Pochvovedenie*, Jan. 1952, p. 72-80.

Describes the above and discusses its uses. Test data are tabulated. 12 ref.

11224* Soil Requirements of Tobacco. (Russian.) A. V. Otrygan'ev. *Pochvovedenie*, Feb. 1952, p. 149-155.

Discusses the physical and chemical requirements of soils suitable for tobacco. Brief comparisons of Russian and foreign practices are made. 14 ref.

11225 Dynamics of Gas Exchange Between the Soil and Atmosphere During the Growing Period With Various Crop Rotations. (Russian.) B. N. Makarov. *Pochvovedenie*, Mar. 1952, p. 270-277.

Experiments were made on the above. Data are tabulated. 12 ref.

11226* The Study of Porosity and Microstructure of Soil Aggregates in Polished Sections. (Russian.) M. N. Pol'skii. *Pochvovedenie*, Apr. 1952, p. 351-356.

Discusses the use of polished specimens in soil studies. Includes photomicrographs.

11227* Alteration of the Nature of Microbes. (Russian.) A. S. Kriviskii. *Priroda*, v. 41, Feb. 1952, p. 66-73.

Reviews papers presented at an All-Union conference on trends in variation and selection of micro-organisms.

11228* Humates of Peat and Coal—Stimulants to Plant Growth. (Russian.) N. N. Dolgopolov and E. L. Ruban. *Priroda*, v. 41, Mar. 1952, p. 102-104.

Discusses the effect of peat, peat extracts, and humates extracted from coal on the growth of roots of bean sprouts.

11229* Combating the Larvae of Malarial Mosquitoes Using Fluorescent Dyes. (Russian.) B. N. Shvanvich. *Priroda*, v. 41, Feb. 1952, p. 121.

Discusses the use of erythrosine, tetrabromofluorescein, bengal-rose, acridine, triboflavin, and similar compounds for the control of anopheles larvae.

11230 The Correlation of Laboratory Screening of Turf Fungicides with Field Results. William Klomparens and John R. Vaughn. *Quarterly Bulletin* (Michigan State College Agricultural Experiment Station), v. 34, May 1952, p. 425-435.

A good field-control fungicide was sought for *Helminthosporium*—a fungus of bent grasses. Control fungi were Copper Spot, Dollar Spot, and Brown Patch. 8 materials were tested. Results discussed and charted. Recommendations given.

11231 Diagnostic Techniques Used in Soil Fertility Studies. K. Lawton, L. S. Robertson, R. L. Cook, and P. J. Rood. *Quarterly Bulletin* (Michigan State College Agricultural Experiment Station), v. 34, May 1952, p. 466-471.

An attempt is made to correlate all the available methods of soil-fertility study. Methods used: yield response from fertilizer; deficiency symptoms test; tissue test—crop response and ash-analysis correlation.

11232* The Use of Copper Oxychloride for Control of Citrus Bacterial Necrosis. (Russian.) Iu. I. Shneider. *Sad i Ogorod*, Mar. 1952, p. 28.

Data are tabulated.

11233* Use of Mineral Oil for the Control of Pests. (Russian.) P. V. Sazonov. *Sad i Ogorod*, Jan. 1952, p. 40-41.

Discusses the use of mineral oil emulsions as dormant sprays for the control of scale and similar pests and as carriers for insecticides such as DDT.

11234* The Use of Peat in Truck Farming. (Russian.) A. Ia. Pikalev and O. E. Fatchikhina. *Sad i Ogorod*, Feb. 1952, p. 67-72.

Peat-manure mixtures with and without bacterial fertilizer additions were used as fertilizer in crop-rotation plans. Data from field tests are tabulated and discussed.

11235* Bacterial Fertilizer AMB. (Russian.) B. R. Gladilovich. *Sad i Ogorod*, Feb. 1952, p. 75-77.

Field tests of the bacterial fertilizer alone and with other fertilizers show a marked increase in yield of potatoes. Data are tabulated.

11236 Effect of an Exogenous Growth Regulator on Proteolytic Enzymes of the Soybean Plant. S. R. Freiberg. *Science*, v. 115, June 20, 1952, p. 674-675.

Describes experiment devised to test above hypothesis. Soybean plants were treated with 2,4-D and analyzed for proteinase and polypeptidase activity in leaves, stems, and roots.

11237* The Organization of Agricultural Research in Switzerland. K. Rudolf. *Science of Food and Agriculture*, v. 3, June 1952, p. 241-244.

Discusses historical development, and lists research agencies and their activities.

11238* The Organization of Agricultural Research in the Netherlands. C. Van Der Giessen. *Science of Food and Agriculture*, v. 3, June 1952, p. 245-247.

Brief coverage of historical development, and existing agencies and their activities. Table.

11239* The Preparation of the Optical Isomers of α-(2,4-Dichlorophenoxy) Propionic Acid and Their Growth-Regulating Activity. S. T. Collins and F. E. Smith. *Science of Food and Agriculture*, v. 3, June 1952, p. 248-249.

11240* The Decomposition of 2:4-Dichlorophenoxyacetic Acid and 2-Methyl-4-Chlorophenoxyacetic Acid in the Soil. L. J. Audus. *Science of Food and Agriculture*, v. 3, June 1952, p. 268-274.

Kinetics of the disappearance of the above from garden loam was studied by a modification of the Lees & Quastel perfusion technique. Suggests that the breakdown is due to a micro-organism population proliferating in response to the perfusion. Graphs.

11241* Influence of Fertilizer on Yield and Chemical Composition of Tomatoes. (Russian.) D. D. Brezhnev and G. V. Boss. *Selektsiia i Semenovodstvo*, v. 19, Apr. 1952, p. 54-60.

Numerous tests and observations confirm the increase of yield and quality of tomatoes due to adding fertilizers, especially mineral-organic granulated types. Data are tabulated.

11242* Conditions of Effective Use of Bacterial Fertilizers in Forest-Podzol Zones. (Russian.) N. Z. Laikov. *Selektsiia i Semenovodstvo*, v. 19, Jan. 1952, p. 61-64.

The use of bacterial fertilizers in acid soil with and without liming is discussed. Data from field tests are tabulated.

11243* Studies on Chemicals With Selective Toxicity to Blue-Green Algae. George P. Fitzgerald, Gerald C. Gerloff, and Folke Skoog. *Sewage and Industrial Wastes,* v. 24, July 1952, p. 888-896.

11244 Synthetic Soil Conditioners. *Soil Science,* v. 73, June 1952, p. 419-492.

Entire issue is devoted to 6 papers presented at a symposium on "Improvement of Soil Structure", held in Philadelphia, Dec. 29, 1951.

11245* The Preparation of Threshed Feeds. (Russian.) G. A. Magidov. *Sotsialisticheskoe Zhivotnovodstvo,* v. 14, Feb. 1952, p. 14-18.

Discusses the use and preparation of straw (oats, barley, peas, vetch, clover, alfalfa, etc.) feeds by steaming and addition of concentrates.

11246* Mineral Supplements for Cattle. (Russian.) G. A. Priemyshev. *Sotsialisticheskoe Zhivotnovodstvo,* v. 14, Mar. 1952, p. 24-25.

Discusses the calcium and phosphorous content of various feeds and the requirements of livestock.

11247* Evergreen Needles as a Vitamin Supplement for Cattle. (Russian.) V. A. Sokolov. *Sotsialisticheskoe Zhivotnovodstvo,* v. 14, Feb. 1952, p. 29-30.

Discusses the results of feeding experiments using the above as a source of Vitamin C.

11248* Pond Fish-Culture in Peat Quarries. (Russian.) F. G. Martyshev. *Sotsialisticheskoe Zhivotnovodstvo,* v. 14, Apr. 1952, p. 47-53.

Discusses the use of ponds in peat quarries as a source of food. The raising and feeding of the fish are discussed. Growth data are tabulated.

11249* The Effect of Chlorine Ions on the Carbohydrate and Nitrogen Economy of Plants Fertilized with Ammonia and Nitrate. (German.) A. Buchner. *Zeitschrift für Pflanzenernährung; Düngung; Bodenkunde,* v. 57(102), no. 1, 1952, p. 1-29.

Pot and water-culture experiments prove that above depends greatly on type of plant and growing conditions. Tables, graphs, and photographs. 25 ref.

Miscellaneous Publications

11250 Radioisotopes in Soils Research and Plant Nutrition. S. B. Hendricks and L. A. Dean. "Annual Review of Nuclear Science." Vol. I. (Annual Reviews, Stanford, Calif.), p. 597-610. (QC780 An78)

71 references.

Books

11251 Pathology in Forest Practice. Ed. 2. Dow Vawter Baxter. 601 pages. 1952. John Wiley & Sons, New York. (SB761 B33p2)

Intended primarily for the student, the timber grower, and the timber user. Pays little attention to details of taxonomy, mycology, and etiology. Describes latest principles and methods of forest-disease prevention and control—with emphasis on the crop and the product. Profusely illustrated. Chapter bibliographies.

11251a Economic Botany; A Textbook of Useful Plants and Plant Products. Ed. 2. Albert F. Hill. 560 pages. 1952. McGraw-Hill, New York. (SB107 H55e2)

11252 Weed Seedlings. Anna P. Kummer. 435 pages. 1951. University of Chicago Press. (SB612.A2 K96w)

This book has been prepared to provide a means for the rapid identification of weed seedlings likely to be found growing in gardens, farms, ranches, or woods. The 300 broad-leaved weeds are illustrated and described. Life-size drawings show the general aspect and growth habit of the plant, including the roots. Drawings of a detached seed leaf, and of the first, third, and fifth leaves, are twice natural size.

11253 Farm Power. Ben D. Moses and Kenneth R. Frost. 484 pages. 1952. John Wiley & Sons, New York. (TJ777.F3 M85f)

Phases included are those generally comprising a one-semester college course and consist of a study of the internal-combustion engine, the farm tractor, and their principal parts, attachments, and related equipment. Planned primarily for college students in agriculture and agricultural engineering, several chapters deal largely with fundamentals of power, work, energy, electricity, and combustion. Problems follow each chapter. 5-page bibliography.

11254 Agrotekhnika. (Agricultural Technology.) Ed. 2. (Russian.) V. P. Mosolov. 431 pages. 1950. State Publishing House of Agricultural Literature, Moscow, U. S. S. R. (SB185 M85a2)

Discusses the general problems of soils and their management (Part One) and those of individual field crops (Part Two).

11255 Agriculture and Economic Progress. E. M. Ojala. 220 pages. 1952. Oxford University Press, London. (HD1411 Oj1a)

Presents material for judgment on a problem which confronts every nation in some degree: "Should the size of the world's agriculture be increased? If so, where and how?" In order to provide an answer, statistics from the United Kingdom, the U. S., and Sweden are assembled relating to national output, agricultural net output, manpower, relative income per head and relative prices.

11256 Land for Tomorrow: the Underdeveloped World. L. Dudley Stamp. 230 pages. 1952. Indiana University Press, Bloomington, Ind.; and American Geographical Society, New York. (HC55 St23J)

The author, a noted English geographer, shows conclusively that the most important underdeveloped lands are *not* in the tropics and uninhabited latitudes; hope for land development lies in the middle latitudes, in the U. S., Soviet Union, Canada, Australia, and the Argentine. Also shows that, while the population of India and China is increasing, the rate of increase of the English-speaking white race is 4 times as rapid as that of the world as a whole. Advocates the removal of man-made barriers and more efficient utilization of present lands. Urges a world-wide survey of land resources.

11257 Wertvolle Kautschukpflanzen des gesmässigten Klimas Dargestellt auf Grund Sowjetischer Forschungsarbeiten. (Valuable Rubber Plants of the Temperate Zone Based on Soviet Research.) Max Ulmann. 562 pages. 1951. Akademie-Verlag, Berlin, Germany. (SB290 UL5w)

Discusses Russian and foreign attempts at raising rubber-plants within the temperate zone; conditions under which rubber-bearing plants can grow; research on the morphology, anatomy, and culture of the various species; methods of determining rubber content; chemistry and physics of vegetable rubber; and industrial methods of extraction. Illustrations, tables, graphs, and numerous references.

11258 Manures and Fertilizers. 95 pages. 1952. Chemical Publishing Co. New York, N. Y. (S633 M31)

Intended to teach the farmer the basic principles of increasing soil fertility by application of natural organic manures and synthetic inorganic fertilizers.

11259 Forestry Terminology: A Glossary of Technical Terms Used in Forestry. Rev. Ed. 93 pages. 1950. Society of American Foresters, Washington. (SD126 So13f)

See also:

10370 (determination of total P in soil)
10442 (spectrographic analysis of plants and soils)
10623 (tobacco-curing system)
10838 (phosphate fertilizers—symposium)
10845 (animal feeds derived from wood chips)
11051 (synthetic plant-growth regulators)
11276 (luminescent organisms)
11506 (U. S. fertilizer consumption for 1950-51)

32. PHYSICS

11260* Research on Discharges in Magnetic Fields. A Contribution to Righi's Magnetic Radiation. (German.) Wilfried H. Bergmann. *Acta Physica Austriaca,* v. 5, no. 4, 1952, p. 425-428.

Photographs illustrate brief article on above. 11 ref.

32. *Physics*

11261* Behavior of Ferrous Magnetic Particles in a Magnetic Rotating Field. (German.) K. V. Desoyer. *Acta Physica Austriaca*, v. 5, no. 4, 1952, p. 429-434.

Photographs and diagrams.

11262* Theory of the Raman Effect. (German.) Frank C. Roesler. *Acta Physica Austriaca*, v. 5, no. 4, 1952, p. 477-495.

11263* Sound Absorption in Sound-Exposed Transformer Oil. (German.) F. Seidl and H. Fellner-Feldegg. *Acta Physica Austriaca*, v. 5, no. 4, 1952, p. 504-509.

Discusses experiments made to study effect of sonic frequencies on the oil by determining its density, viscosity, sonic velocity, and sound absorption. Photographs.

11264* Report on Recent Developments in Quantum Electrodynamics. (German.) Kurt Baumann. *Acta Physica Austriaca*, v. 5, no. 4, 1952, p. 544-558.

11265* Contribution to Ultrasonic Measuring Techniques for Liquids. (German.) Jan Koppelmann. *Acustica*, v. 2, no. 2, 1952, p. 92-95.

The 1st part describes a new form of microphone for point-to-point probing of ultrasonic fields in liquids at frequencies above 100 kc./s. The 2nd part is concerned, as an extension to the previous work of Hertz and Mende, with the conditions for Langevin's formula for acoustic radiation pressure.

11266 Mechanism of Turbulent Fluid Motion. Max Munk. *Aero Digest*, v. 64, June 1952, p. 32, 34, 36, 38, 40, 42, 44, 46, 48.

German authority in theoretical aerodynamics presents novel approach to above problem. Clarified by schematic diagrams.

11267* Boundary-Layer Studies on a Sailplane. August Raspet. *Aeronautical Engineering Review*, v. 11, June 1952, p. 52-60.

Article is offered as an example of the unique possibilities of the sailplane in boundary-layer research. Graphs, diagrams, and photographs. 23 ref.

11268* The Critical Flow of Gases Through Nozzles. B. Szczeniowski. *Aircraft Engineering*, v. 24, June 1952, p. 177-178.

Discusses above in reference to a number of letters-to-the-editor on the subject. 12 ref.

11269 Internal Photo Effect in Polycrystalline Cadmium Sulfide. (Russian.) B. T. Kolomiets. *Doklady Akademii Nauk SSSR*, new ser., v. 83, Apr. 1, 1952, p. 561-563.

Experimental data. Tables and graphs.

11270 Sensitization of Bacteria by Beta-Rays to the Influence of High and Low Temperatures and to the Repeated Effects of Beta-Rays. (Russian.) E. Ia. Graevskii. *Doklady Akademii Nauk SSSR*, new ser., v. 83, Apr. 1, 1952, p. 565-568.

Includes graphs.

11271* The Metastable State of $BaTiO_3$. (Russian.) N. S. Novosiltsev, A. L. Khodakov, and M. S. Shul'man. *Doklady Akademii Nauk SSSR*, new ser., v. 83, Apr. 21, 1952, p. 829-831.

The effect of aging on dielectric permeability and on the tangent of the loss angle of $BaTiO_3$ was investigated. Data are charted.

11272* Limiting State of One-Dimensional Flow of a Viscous Gas Under Pressure in Cylindrical Tubes. (Russian.) A. L. Kliachkin. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 11, 1952, p. 241-244.

Mathematical analysis and graphical interpretation.

11273* Absorption of Light by Cuprous Oxide Crystals in the Infrared and Visible Parts of the Spectrum. (Russian.) E. F. Gross and N. A. Karryev. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 11, 1952, p. 261-264.

Experimental results are discussed and charted.

11274* Calculation of the Rate of Growth of Nuclei of New Phases During Phase Transformation in a Single-Component System. (Russian.) B. Ia. Liubov. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 11, 1952, p. 277-279.

Mathematical analysis and graphical interpretation.

11275* Magnetic Strength of Nickel-Zinc Ferrites. (Russian.) E. F. Kuritsyna. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 1952, p. 45-46.

Three Ni-Zn ferrites (composition not given) were used in the experiments. Magnetization and hysteresis data for different heat treatments were obtained. Data are charted.

11276 Luminescent Organisms. E. Newton Harvey. *American Scientist*, v. 40, July 1952, p. 468-481.

An illustrated review of the emission of light by living things such as fireflies and glow-worms. Mechanism of light production is discussed. Shows that luminous organisms are of basic value for study of light production and in addition are very useful in investigation of vital activity in general.

11277* Distribution of Heat-Transfer Coefficients Around Circular Cylinders in Crossflow at Reynolds Numbers From 20 to 500. E. R. G. Eckert and E. Soehngen. *Transactions of the American Society of Mechanical Engineers*, v. 74, Apr. 1952, p. 343-346; disc., p. 346-347.

Experimental investigations, using the Zehnder Mach interferometer, reveals the temperature field around heated cylinders in an air stream normal to the axis. From the temperature distribution, local distribution of the heat-transfer coefficient around the cylinder circumference is obtained.

11278* The Semiconducting Properties of Cuprous Oxide. I. Methods of Production With Emphasis on Stability Factors. (German.) G. Blankenburg and K. Kassel. **II. Effect of Disorder on Optical Absorption.** (K. Kassel.) **III. Dependence of Specific Electrical Conductivity at Low Temperatures on the Oxygen Pressure of a Previous Tempering Operation.** G. Blankenburg, C. Fritzsche, and G. Schubart. **IV. Conductivity at High Temperatures.** O. Böttger. **V. Explanation of the Dependence of Electrical Conductivity at Low Temperatures on Tempering Pressure.** G. Blankenburg and O. Böttger. *Annalen der Physik*, ser. 6, v. 10, nos. 4-5, 1952, p. 201-252.

75 references.

11279* Recent Contributions to the Theory of Supersonic Flow. Robert Sauer. *Applied Mechanics Reviews*, v. 5, April 1952, p. 145-147.

A systematic survey of the development of the mathematical theory of nonviscous supersonic flow since 1945. Numerous refs.

11280* On the Theory of the Ranque-Hilsch Cooling Effect. J. J. Van Deemter. *Applied Scientific Research*, v. 3, sec. A, no. 3, 1952, p. 174-196.

An extended Bernoulli equation, adapted to turbulent flow, is applied to a model of the rotational flow in the Ranque-Hilsch vortex tube. Shows that, on the basis of this model, a reasonable quantitative explanation of the cooling effect can be given. A theoretical interpretation is given of influence of size of diaphragm. Graphs and tables. 16 ref.

11281* The Contribution of Radiation to the Conduction of Heat. E. F. M. Van Der Held. *Applied Scientific Research*, v. 3, sec. A, no. 3, 1952, p. 237-249.

Theoretical and mathematical. Solutions are given for the steady state, for source functions, and for problems which can be solved by separation of variables. Some applications are given.

11282* Approximations in Transient Surface Heating. J. C. Jaeger. *Australian Journal of Scientific Research*, ser. A, v. 5, Mar. 1952, p. 1-9.

A number of exact solutions for surface temperature of a semi-infinite solid heated over a region of its surface are given. These have applications to edge effects in surface induction heating, to heating of the anode of an X-ray tube, and to heating by friction. The regions discussed are a half-plane, a strip, a square, a rectangle, and a circle.

11283* Recent Research on Radio-Luminescence. G. F. J. Garlick. *British Journal of Applied Physics*, v. 3, June 1952, p. 169-172.

A review of above with graphical and tabular data. Stresses re-

cently-acquired quantitative information obtained by use of single crystals, phosphor films, and other new techniques. 16 ref.

11284* Permanent Magnets for Spectrographs and Nuclear Physical Research. D. Hadfield and D. L. Mawson. *British Journal of Applied Physics*, v. 3, June 1952, p. 199-202.

Discusses some advantages of the permanent and electro-permanent magnet over the electromagnet. Considers applications to various branches of particle research and describes early and recent designs. Graphs and drawings.

11285 Harwell—The First Five Years; Problems of Atomic Energy Research. *Chemical Age*, v. 84, June 14, 1952, p. 883-886.

Summarizes equipment and work of British atomic-energy establishment.

11286* Migration of S^{35} in NaCl Exposed to an Electric Field. (French.) Marius Chemla. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 234, May 19, 1952, p. 2064-2066.

Migration of S^{35} in NaCl toward the anode produced by fast neutrons is described. The relationship between the diffusion coefficient and the ion mobility was measured at temperatures between 650 and 775°C. Einstein's formula does not apply.

11287* Behavior of Dispersions in a Magnetic Field. (French.) Olga Tanaevsky. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 234, May 19, 1952, p. 2067-2069.

Reports on observations concerning the increase of the absolute value of specific susceptibility in HgO and SnO_2 in aqueous dispersion, when the size of the particles decreases. Findings are compared with those for Ag, Hg, Ag_2S, ZnS, and CdS, not showing the same phenomenon. Data are tabulated.

11288* Semiconductive Properties of Ferrous Oxides. (French.) Jean Martinet. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 234, May 26, 1952, p. 2167-2169.

Reports on experiments on the semiconductive properties of Fe_3O_4, α-Fe_2O_3, γ-Fe_2O_3, and their mixtures and compounds. The experiments were done at temperatures of −190 and +100°C. Anomalies found are interpreted. Graphs.

11289* Thermomagnetic Study of an α-Fe_2O_3 Monocrystal. (French.) Louis Néel and René Pauthenet. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 234, May 26, 1952, p. 2172-2174.

Reports on investigation of the specific magnetization of a natural α-Fe_2O_3 monocrystal at temperatures between 20.4 and 950°K. Experimental arrangement is described; data are charted.

11290* The Paramagnetism of Iron Sulfides. (French.) René Benoit. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 234, May 26, 1952, p. 2174-2175.

The above was studied for various sulfides of Fe at different temperatures. Data are charted.

11291* The Response of Cells to a Nonconductive Layer. A Theory Permitting Prediction of Voltages Produced as a Function of Illumination and of Resistance to Charge by a Photoelectric Cell With a Nonconductive Selenium Layer. (French.) Georges Blet. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 234, May 26, 1952, p. 2187-2189.

Describes mathematical method for the above. The proposed method makes it possible to reduce presentation of the above to a single curve. Graphs.

11292* A Type of Non-Homogeneous, Turbulent Flow. (French.) Jean Bass. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 234, June 4, 1952, p. 2256-2257.

General structure and local form of above type of flow were studied. Space-temperature correlations are indicated. Various theoretical findings are discussed.

11293* Negative Photometric and Its Connection With a Recent Radiometric Experiment. (French.) Pierre Tauzin. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 234, June 4, 1952, p. 2265-2267.

Describes experiment on above and states that attraction by light of a radiometer vane containing a deposit of smoke is not a true photophoresis effect. Reviews related phenomena.

11294* The ABC's of Germanium. J. P. Jordan. *Electrical Engineering*, v. 71, July 1952, p. 619-625.

Germanium is one of the most important elemental semiconductors. Some of the mechanisms governing its behavior are presented in a simplified manner as background for the understanding of the physics of the industrial devices utilizing it.

11295 Ultrasonic Ranging for Cancer Diagnosis. John M. Reid and John J. Wild. *Electronics*, v. 25, July 1952, p. 136-138.

Describes portable instrument for above. Increased echo amplitude was found from cancerous tissue. Block and circuit diagrams and photographs.

11296 Ultrasonics Aids Diathermy Experiments. Herman P. Schwan and Edwin L. Carstensen. *Electronics*, v. 25, July 1952, p. 216, 218, 220.

Describes technique for studying the acoustic impedance of blood and other tissue. Apparatus and block diagrams.

11297* Mobility in a Sorbed Layer. Part II. Surface Flow Through Pores of Molecular Dimensions. W. Mervyn Jones. *Transactions of the Faraday Society*, v. 48, June 1952, p. 562-567.

The equation of Part 1 is used to determine the factors which govern the flow of gases through membranes consisting of pores not much larger than the diffusing molecule. In this way, effects on flow of size of the diffusing molecule, of pressure in the vapor phase, and of simultaneous gradients of temperature and of pressure across the porous material are examined. In addition, Pick's law is derived and osmotic effects are investigated theoretically. Coordinates governing surface flow were found to be similar to those governing flow through materials by the mechanism of place exchange or vacancy diffusion. 15 ref.

11298* Studies on the Mutagenic Action of Chemical and Physical Agencies on Yeasts. S. Duraiswami and M. K. Subramaniam. *Proceedings of the Indian Academy of Sciences*, v. 35, sec. B, Apr. 1952, p. 155-166.

Photographs of giant colonies of the treated and the control material are presented. A theory of the mode of action of the various biologically effective physical and chemical agents on living organisms is considered. 24 ref.

11299* Temperature Dependence of Ultrasonic Velocity in Liquid Mixtures. K. S. Iyengar. *Proceedings of the Indian Academy of Sciences*, v. 35, sec. A, Apr. 1952, p. 190-193.

Results are charted and tabulated for C_6H_6-CCl_4, C_6H_6-$C_6H_5Cl_3$, and C_2H_5OH-C_6H_6.

11300* An Approximate Theory of the Cavity Resonator Method of Determining the Dielectric Loss of Solids at Microwave Frequencies. S. K. Chatterjee. *Journal of the Indian Institute of Science*, v. 34, sec. B., Apr. 1952, p. 43-49.

11301 Laminar-Turbulent Transition in Smooth Tubes. R. R. Rothfus and R. S. Prengle. *Industrial and Engineering Chemistry*, v. 44, July 1952, p. 1683-1688.

Presents data of basic significance to the prediction of heat and mass-transfer rates in process equipment operated in the transition flow range. Results are discussed. Tables, graphs, photographs. 14 ref.

11302* Piezoelectric Transducers for Ultrasonic Delay Lines. H. N. Beveridge and W. W. Keith. *Proceedings of the I.R.E.*, v. 40, July 1952, p. 828-835.

The over-all frequency response and loss of the transducers of a delay line are derived from Roth's equivalent circuit. The transient response of a delay line is computed from an equivalent transmission-line circuit. Graphs.

11303* Diffuser Efficiency of Free-Jet Supersonic Wind Tunnels at Variable Test Chamber Pressure. Rudolf Hermann. *Journal of the Aeronautical Sciences*, v. 19, June 1952, p. 375-384.

Analysis deals with above case, in which the test-chamber pres-

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sure is different from the nozzle-exit pressure. Results are presented in 8 graphs over a Mach number range of 1-10, showing velocity and pressure after the transformation, diffuser efficiency, total pressure ratio, and diffuser-throat area. Also shows the exact mechanism of test-chamber pressure control for the subsonic solution.

11304* Impingement of Spherical Water Droplets on a Wedge at Supersonic Speeds in Air. Myron Tribus and Armand Guibert. *Journal of the Aeronautical Sciences*, v. 19, June 1952, p. 391-394, 403.

The water-drop interception characteristics of a wedge in a supersonic flow field are investigated analytically for the case of flow in which the shock wave is not detached. Graphs.

11305* Two-Dimensional Losses in Turbine Blades. Charles A. MacGregor. *Journal of the Aeronautical Sciences*, v. 19, June 1952, p. 404-408, 432.

Tests were made on 3 typical turbine blades in a 2-dimensional cascade tunnel at varying angles of attack, stagger angle, solidity, and down-stream survey stations at a Mach number of about 0.4 and a Reynolds Number of 6.5×10^5. Static pressure distribution about the blade was measured by 27 static pressure taps. The wake behind the blade row was surveyed and the loss determined. 11 ref.

11306* A High-Speed Schlieren Technique for Investigation of Aerodynamic Transients. Walter S. Bradfield and Walter Y. Fish. *Journal of the Aeronautical Sciences*, v. 19, June 1952, p. 418-420, 432.

Describes development of above technique. Data recorded at a Mach Number of 3.5 in an intermittent wind tunnel. Photographs of equipment and circuit diagrams.

11307* Supersonic Flow With Variable Specific Heat. F. P. Durham. *Journal of Applied Mechanics*, v. 19 (*Transactions of the American Society of Mechanical Engineers*, v. 74), Mar. 1952, p. 57-62.

Formulas are developed for stagnation conditions and one-dimensional flow through shock waves, including Rankine-Hugoniot values, taking into account the variation of the specific heat of air with temperature by means of the concept of mean specific heats. These formulas are reduced to correction factors. The limitations imposed by deviation of a gas from the ideal are discussed.

11308* A Contribution to the Theory of the Development and Stability of Detonation in Gases. A. K. Oppenheim. *Journal of Applied Mechanics*, v. 19, (*Transactions of the American Society of Mechanical Engineers*, v. 74), Mar. 1952, p. 63-71.

Development of detonation of an explosive gas mixture contained in a constant-cross-section duct is analyzed on the basis of a unidimensional, gasdynamic treatment of a double-discontinuity combustion system. Includes an appendix dealing with the process at constant stream-force function per unit area—the Rayleigh Line. Graphs. 23 ref.

11309* Measurement of Recovery Factors and Friction Coefficients for Supersonic Flow of Air in a Tube. 1. Apparatus, Data, and Results Based on a Simple One-Dimensional Flow Model. J. Kaye, J. H. Keenan, K. K. Klingensmith, G. M. Ketchum, and T. Y. Toong. **2. Results Based on a Two-Dimensional Flow Model for Entrance Region.** J. Kaye, T. Y. Toong, and R. H. Shoulberg. *Journal of Applied Mechanics*, v. 19, (*Transactions of the American Society of Mechanical Engineers*, v. 74), Mar. 1952, p. 77-96; June 1952, p. 185-194.

A study in reference to obtaining reliable data on the rate of heat transfer to air moving at supersonic speeds. Test layout diagram, apparatus drawings, photographs, and graphs. 23 ref.

11310* Gas Cooling of a Porous Heat Source. Leon Green, Jr. *Journal of Applied Mechanics*, v. 19 (*Transactions of the American Society of Mechanical Engineers*, v. 74), June 1952, p. 173-178.

A study of a limiting case of heat removal from a porous wall by a gaseous coolant when the surface per unit volume of the porous structure is high enough that the temperature of the fluid at any point in its path may be considered to be substantially the same as that of the adjacent solid. Includes hypothetical case of a heated graphite wall cooled by helium. Graphs and diagrams. 15 ref.

11311* Heat Conduction in a Compressible Fluid. J. D. Cole and T. Y. Wu. *Journal of Applied Mechanics*, v. 19 (*Transactions of the American Society of Mechanical Engineers*, v. 74), June 1952, p. 209-213.

Some exact equations of motion and heat transfer are studied briefly. It is next assumed that all disturbances are small so that the equations can be linearized. For this linear system, the fundamental solutions are found and discussed in some detail.

11312 The Thermal Neutron Diffusion Length in a Heterogeneous Pile. Gilbert N. Plass. *Journal of Applied Physics*, v. 23, June 1952, p. 621-624.

Derives more exactly the relation of thermal-neutron diffusion length to the fundamental nuclear constants of a heterogeneous pile containing spherical lumps of fissionable material arranged in a lattice structure. An expanded and improved version of work done in 1943. Table.

11313 X-ray Absorption Corrections for Single Crystals. Howard T. Evans, Jr. *Journal of Applied Physics*, v. 23, June 1952, p. 663-668.

Describes how the absorption effect on diffraction intensities may be determined by means of exact expressions for single crystals of known shape and dimensions. The application of the method, including corrections for secondary extinction, is illustrated by calculations on tetragonal barium titanate. Tables and diagrams.

11314 Energy Transference Between Wave Numbers in Isotropic Turbulence. Hiroshi Sato. *Journal of Applied Physics*, v. 23, June 1952, p. 698-699.

Describes a method and gives data for estimating the above directly from the energy spectrum. Graphs.

11315* On The Linearized Potential Theory of Unsteady Supersonic Motion. II. K. Stewartson. *Quarterly Journal of Mechanics and Applied Mathematics*, v. 5, June 1952, p. 137-154.

11316 The Growing of Single Crystals of Magnetite. J. Smiltens. *Journal of Chemical Physics*, v. 20, June 1952, p. 990-994.

Large, single crystals of magnetite, 1-43 cm. long, of high purity, were grown from the melt. The density at 20°C. was 99.58% of the x-ray density. Phase diagram considerations, growing procedures, methods of chemical analysis, and composition data are discussed. Tables and graphs. 10 ref.

11317* Mathematics of Adsorption in Beds. V. Effect of Intraparticle Diffusion in Flow Systems in Fixed Beds. Paul R. Kasten, Leon Lapidus, and Neal R. Amundson. *Journal of Physical Chemistry*, v. 56, June 1952, p. 683-688.

Presents the equations derived for heat- and mass-transfer operations in fixed beds of solids through the interstices of which a fluid flows. The effect of conduction is considered as well as resistance to transfer at the particle surface. Discussion is essentially a generalization of the results of other workers.

11318* On the Characteristic Surfaces of the von Mises Plasticity Equations. T. Y. Thomas. *Journal of Rational Mechanics and Analysis*, v. 1, July 1952, p. 343-357.

Mathematical analysis of the above.

11319* Extremal Methods in Cavitational Flow. P. R. Garabedian and D. C. Spencer. *Journal of Rational Mechanics and Analysis*, v. 1, July 1952, p. 359-409.

Presentation of hydrodynamical problems using the modern theory of variational techniques in conformal mapping. 13 ref.

11320* Steady Rotational Flow of Ideal Gases. R. C. Prim, 3rd. *Journal of Rational Mechanics and Analysis*, v. 1, July 1952, p. 425-497.

Discusses the steady rotational flow of nonviscous and thermally nonconducting gases subject to no extraneous force field. Attention is restricted mainly to gases having constant specific heats. However, some of the results are valid for more general classes of fluids. Numerous graphs and diagrams.

11321* Study of the Conductivity of Semiconductors and Application of the Results to Mixed Oxide Systems. (French.) Charles Guillaud and Roger Bertrand. *Journal des Recherches du Centre National de la Recherche Scientifique*, Mar. 1952, p. 118-130.

Behavior of the $Fe_2O_3.(1-x)MO$ system. Discusses the problems of measuring the resistance of semiconductors. Results of various measurements in above system are indicated and interpreted. Tables and graphs.

11322* Making Visible in Plastics of Ultrasonic Waves by Lowering of the Boundary Surface Energy. (German.) H. H. Rust and H. Drubba. *Kolloid Zeitschrift*, v. 127, June 1952, p. 38-39.

Describes technique. Illustrates typical results.

11323* Further Investigations and Observations on Cold Working. (German.) F. H. Müller. *Kolloid Zeitschrift*, v. 126, May 1952, p. 65-72; disc., p. 72.

Results of this study indicate that they are of very general importance to our understanding of the behavior of matter. The deforming process is shown to be irreversible and is ascribed to forced transpositions, corresponding to viscoelastic hysteresis comparable to magnetic hysteresis. Graphs. 14 ref.

11324 Ultrasonic Waves in Micro-Biology. (Russian.) I. E. El'piner. *Mikrobiologiia*, v. 21, Mar.-Apr. 1952, p. 228-238.

A review. 54 ref.

11325* On the Statistical Theory of Turbulent Diffusion. Francois N. Frenkiel. *Proceedings of the National Academy of Sciences*, v. 38, June 1952, p. 509-515.

Mathematical consideration of the turbluent diffusion in a field of homogeneous and isotropic turbulence when the velocities cannot be assumed to be small as compared to mean velocity.

11326 A New After-Effect of X-Rays on Dilute Aqueous Suspension of Bacteriophage. Tikvah Alper. *Nature*, v. 169, June 7, 1952, p. 964-965.

Shows that when dilute aqueous suspensions of bacterial virus are exposed to x- or γ-rays, inactivation of the virus continues after the cessation of radiation. Discusses various phases of the experiment. Graphs.

11327 Effect of Ionizing Radiation on Protein Denaturation. Hugo Fricke. *Nature*, v. 169, June 7, 1952, p. 965-966.

It was found that the denaturation of solutions of egg albumin and haemoglobin subjected to x-rays can be defined quantitatively by the coagulation method. Graph shows some results obtained in a thermal study (29.70-59.20°C.) of an egg-albumin system irradiated with x-rays.

11328* Interaction of Phosphorus-32 Beta Rays With Matter. Gordon L. Brownell. *Nucleonics*, v. 10, June 1952, p. 30-35.

Energy distribution of of β-rays from a thin P^{32} source mounted on collodion film was measured before and after addition of various metallic absorbers and backscatterers. Angular distribution was also determined. Graphs. 16 ref.

11329* Large-Area Liquid Scintillation Counters. F. B. Harrison. *Nucleonics*, v. 10, June 1952, p. 40-45.

Considers the design of 2 types of liquid scintillation counters. Tables and graphs. 20 ref.

11330* Afterpulsing in Photomultipliers. Donald W. Mueller, George Best, Jasper Jackson, and John Singletary. *Nucleonics*, v. 10, June 1952, p. 53-55.

Discusses above problem and how it can be partially eliminated by using tubes with shielded structures.

11331* Resolving Time of Scintillation Counters. R. F. Post. *Nucleonics*, v. 10, June 1952, p. 56-58.

Statistical analysis indicates that the limiting resolving time now obtainable is $3x10^{-10}$ sec. Light pipes of moderate length can double the resolving time, according to calculations.

11332 Purification of Rare Gases by Activated Uranium. G. H. Dieke and H. M. Crosswhite. *Journal of the Optical Society of America*, v. 42, June 1952, p. 433.

Calls attention to a little-known method used successfully for rare-gas purification.

11333* The High Frequency Resistance of Metals in the Normal and Superconducting State. C. J. Grebenkemper and John P. Hagen. *Physical Review*, ser. 2, v. 86, June 1, 1952, p. 673-679.

Above resistance of Pb, In, and Sn was measured at frequencies of 9000 mc. per sec. using resonant-cavity techniques. Preliminary measurements on Sn at 24,000 mc. per sec. also were made. Experimental techniques and measurement procedure.

11334* Particle Counting by Cerenkov Radiation. John Marshall. *Physical Review*, ser. 2, v. 86, June 1, 1952, p. 685-693.

Problems associated with Cerenkov counting and some of its uses are discussed together with the design and performance of several types of counters.

11335* Nuclear Magnetic Resonance of Hydrogen Absorbed Into Palladium Wires. R. E. Norberg. *Physical Review*, ser. 2, v. 86, June 1, 1952, p. 745-752.

Describes in detail experiment on above. Graphs.

11336* Theory of the Production of Secondary Electrons in Solids. A. J. Dekker and A. van der Ziel. *Physical Review*, ser. 2, v. 86, June 1, 1952, p. 755-760.

A general formulation of the above problem. Basic features of existing theories. Special attention is given to the process of production of secondaries and to energy losses suffered by the bombarding primaries.

11337* Formation and Annulment of Space Charges in Glass and Their Influence on Electric Breakdown. K. J. Keller. *Physical Review*, ser. 2, v. 86, June 1, 1952, p. 804-805.

Discusses previous experiments of the author and relates them to his most recent work. Histograms.

11338* The Spherical Model of a Ferromagnet. T. H. Berlin and M. Kac. *Physical Review*, ser. 2, v. 86, June 15, 1952, p. 821-835.

Describes the above, a mathematical model. It is a generalization of the Ising model; and 1-, 2-, and 3-dimensional lattices of infinite extent can be extensively discussed. A 3-dimensional lattice shows ferromagnetic behavior and provides a statistical model of the Weiss phenomenological theory. A simplified model, the Gaussian model, is briefly discussed.

11339* A Note on Wooldridge's Theory of Secondary Emission. E. M. Baroody. *Physical Review*, ser. 2, v. 86, June 15, 1952, p. 915-916.

Mathematical discussion. Concerns a modification of the Wooldridge theory to explain maxima in the experimental curves.

11340* Thermal Ionization of Trapped Electrons. Ryogo Kubo. *Physical Review*, ser 2, v. 86, June 15, 1952, p. 929-937.

Rate of thermal ionization of an electron trapped on an impurity atom is treated on a quantum-mechanical basis. Multiphonon transitions are attributed to dependence of atomic vibrations on electronic states. Approximate formulas based on an Einstein model are derived for total ionization rate. Graphs.

11341* Measurement of Neutron Densities With Crystals of NaI(Tl). Bertel Grimeland. *Physical Review*, ser. 2, v. 86, June 15, 1952, p. 937-939.

Crystals of NaI(Tl) were irradiated in a nuclear reactor and the induced activity in Na and I registered with a photomultiplier tube. It was found that an absolute measurement of the activities can be made in this way. Comparisons were also made between the Na and I cross sections for capture of thermal neutrons. Tables and graphs. 10 ref.

11342* Impedance Measurements on PbS Photoconductive Cells. E. S. Rittner and F. Grace. *Physical Review*, ser. 2, v. 86, June 15, 1952, p. 955-958.

It is concluded from an analysis of above that the observed decrease in parallel resistance with frequency is attributable to a known effect of distributed capacitance and should no longer be cited as convincing evidence for the existence of internal barriers in these photocells. Graphs and apparatus and circuit diagrams.

11343* An Hysteresis Effect in the Transmission of Electrons Through Thin Dielectric Foils. Paul H. Owen and C.

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Sharp Cook. *Physical Review*, ser. 2, v. 86, June 15, 1952, p. 961-963.

Presents a study in which the relative transmission of monoenergetic electrons through a dielectric foil suspended in vacuum was observed to depend upon the previous history of the foil. Data are given concerning the cause of the phenomenon. Photograph and graphs.

11344* Effects of Dislocations on Mobilities in Semiconductors. D. L. Dexter and F. Seitz. *Physical Review*, ser. 2, v. 86, June 15, 1952, p. 964-965.

The scattering of electrons or holes in semiconductors by the dilation of the lattice around rigid, randomly-arranged edge-type dislocations is treated by the method of the deformation potential. The contribution of this scattering to the electrical resistance is determined. Temperature dependence of the reciprocal of the mobility is given, also a discussion on obtaining experimental information concerning dislocations in semiconductors by electrical measurements.

11345* Molecular Field Treatment of Ferromagnetism and Antiferromagnetism. J. Samuel Smart. *Physical Review*, ser. 2, v. 86, June 15, 1952, p. 968-974.

A modified Weiss treatment of magnetism in crystals which considers both first and second nearest neighbor interactions with all 4 combinations of signs was carried out. Expressions are derived for susceptibility of an antiferromagnet above and below the Curie temperature. Diagrams and tables. 11 ref.

11346* Ferromagnetic Resonance in Nickel Ferrite as a Function of Temperature. D. W. Healy, Jr. *Physical Review*, ser. 2, v. 86, June 15, 1952, p. 1009-1013.

Above was studied over the range −195 to 588°C. From this study variation in line width with temperature, g value, and magnetic anisotropy constants were determined. Block and apparatus diagrams and graphs. 18 ref.

11347* Ferromagnetic Resonance in Copper Ferrite. Tosihiko Okamura and Yuzo Jokima. *Physical Review*, ser. 2, v. 86, June 1952, p. 1040-1041.

Above was studied from −195 to +470°C. at 24,000 Mc. per sec., and the resonance phenomena in some sintered polycrystalline specimens were also studied. The g-factor, first-order magnetocrystalline anisotropy, and saturation magnetization were determined from the resonance data as functions of temperature. Table and graphs.

11348* A Magnetic Effect in Magnesium Titanate. E. K. Weise and H. Katz. *Physical Review*, ser. 2, v. 86, June 15, 1952, p. 1046-1047.

Chiefly concerns the paramagnetic susceptibility vs. percentage of removed oxygen curve for $MgTi_2O_5$. It shows a remarkable peak between 0.15 and 0.25%.

11349* Lattice Imperfections of Diamond. P. G. Klemens. *Physical Review*, ser. 2, v. 86, June 15, 1952, p. 1055.

Discusses above especially in relation to thermal conductivity.

11350 The Range-Energy Relation for Protons in Aluminium. D. H. Simmons. *Proceedings of the Physical Society*, v. 65, sec. A, June 1, 1952, p. 454-456.

Nuclear emulsions were used to measure the energy loss of initially 10 Mev. protons in traversing a thickness of Al which reduces their energy to about 3 Mev. Tables.

11351 The Response of a NaI Scintillation Counter to Slow and Fast Neutrons. M. A. Grace, H. R. Lemmer, and H. Halban. *Proceedings of the Physical Society*, v. 65. sec. A, June 1, 1952, p. 456-457.

A neutron source, free from γ-ray background, was used to determine the above for use in investigating the inelastic scattering of fast neutrons.

11352 The Parameters of Partially Degenerate Semiconductors. J. S. Blakemore. *Proceedings of the Physical Society*, v. 65, sec. A, June 1, 1952, p. 460-461.

Mathematical presentation of the concept of the Fermi level and methods for its evaluation.

11353 Further Results in the General Theory of Barrier Layer Rectifiers. P. T. Landsberg. *Proceedings of the Physical Society*, v. 65, sec. B, June 1, 1952, p. 397-409.

The general theory of barrier layer rectifiers is introduced so that a single analysis can cover all likely impurity center distributions in the semiconductor. The theory can be applied to experimental material of considerable variety. 20 ref.

11354 Breakdown in Selenium Rectifiers. R. Cooper. *Proceedings of the Physical Society*, v. 65, sec. B, June 1, 1952, p. 409-414.

Experiments were carried out to determine how the breakdown voltage varied with ambient temperature, counter-electrode metal, and the thermal dissipation constant of Se rectifiers. Both commercial and fully formed laboratory prepared rectifiers were used. 13 ref.

11355 Characteristics of Scintillation Counters. G. F. J. Garlick and G. T. Wright. *Proceedings of the Physical Society*, v. 65, sec. B, June 1, 1952, p. 415-421.

Experimental studies were made of the distribution in size of output pulses from a scintillation counter detecting monoenergetic α-particles. Separate investigations were made of contributions to pulse size spread by the photomultiplier and by the scintillating crystal.

11356 Propagation of Ultrasonic Waves in Vapours Near the Critical Point. H. D. Parbrook and E. G. Richardson. *Proceedings of the Physical Society*, v. 65, sec. B, June 1, 1952, p. 437-444.

An experimental study was made of the velocity and absorption of ultrasonic waves in CO_2 and C_2H_2 at frequencies ½-2 Mc./s. and at pressures up to 100 atm. in a variable-path acoustic interferometer. 11 ref.

11357 Ferromagnetic Resonance in Manganese Antimonide. G. D. Adam and K. J. Standley. *Proceedings of the Physical Society*, v. 65, sec. B, June 1, 1952, p. 454-455.

Ferromagnetic resonance absorption was studied in powdered specimens of MnSb at a wavelength of 1.26 cm. and in the range 20°C. to the Curie Point (315°C.).

11358* Ferroelectric Substances. (Russian.) S. B. Gurevich and V. G. Panchenko. *Priroda*, v. 41, Mar. 1952, p. 54-62.

Reviews dielectric and magnetic properties of materials such as $NaKC_4H_4O_6 \cdot 4H_2O$, KH_2PO_4, KH_2AsO_4, $BaTiO_3$, $NaCbO_3$, $CdTiO_3$-$PbTiO_3$, and $SrTiO_3$-$PbTiO_3$. Data are tabulated and charted. 12 ref.

11359* Axially Symmetrical Jet Mixing of a Compressible Fluid. S. I. Pai. *Quarterly of Applied Mathematics*, v. 10, July 1952, p. 141-148.

A mathematical analysis of the above fluid, exhausting into a uniform stream. Both laminar and turbulent cases are considered. 12 ref.

11360* The Drag on Slender Pointed Bodies in Supersonic Flow. G. N. Lance. *Quarterly Journal of Mechanics and Applied Mathematics*, v. 5, June 1952, p. 165-177.

The linearized theory of supersonic flow is used to determine wave drag on slender pointed bodies, both of revolution and with an arbitrary cross-section.

11360a *Radiology*. Published monthly by Radiological Society of North America, Syracuse, New York.

Devoted to clinical radiology and allied sciences. Contents include original articles, editorials, announcements and book reviews, and abstracts of current literature.

11361* Absorption of 2-mev Constant Potential Roentgen Rays by Lead and Concrete. W. W. Evans, R. C. Granke, K. A. Wright, and J. G. Trump. *Radiology*, v. 58, April 1952, p. 560-567.

The Cu absorption curve and the half-value layer in Cu, Pb, and concrete were measured for these supervoltage rays and compared with the closely equivalent, though less intense, gamma rays from radioactive sources. The transmission of 2-million-volt constant potential x-rays through barriers of Pb and concrete was determined for both small and large beams. Absorption characteristics of Al are also given. Graphs and tables.

11362* Industrial Applications of Semi-Conductors. 4. Lead Sulphide Photo-Cells. C. J. Milner and B. N. Watts. *Research*, v. 5, June 1952, p. 267-273.

The mechanism of photosensitivity, the properties of lead sulfide cells, and their applications are described. 28 ref.

11363 Gamma-Ray Absorption Coefficients. Charlotte Meaker Davisson and Robley D. Evans. *Review of Modern Physics*, v. 24, Apr. 1952, p. 79-107.

Surveys absorption of radiation in the energy range from 0.1-6 Mev. Results of the theories of Compton effect, photoelectric effect, and pair production are given in the form of equations, tables, and curves. Necessary considerations in studying absorption coefficients are discussed and results of various workers are compared with theory. Concludes that, in this energy range, present theories give values of absorption coefficients which are in good agreement with those obtained experimentally. Includes tabular and graphical data for specific elements, including C, Fe, Al, Cu, Ag, Sn, Ta, Pt, and Pb. 64 ref.

11364 The Fundamental Limit of Sensitivity of Photometers. Richard Wilson. *Review of Scientific Instruments*, v. 23, May 1952, p. 217-223.

Statistical fluctuations in the detection of light quanta by photocells are considered. Discussion of the various methods of detection of the photoelectric current compares extent to which each method approaches the limiting sensitivity. 31 ref.

11365 Wide-Range Logarithmic Radiation Meter. R. E. Bell and R. L. Graham. *Review of Scientific Instruments*, v. 23, June 1952, p. 301-304.

Above meter is described using the detector, a photomultiplier and scintallation phosphor. Circuit details and experimental results are given for a battery-operated portable model and an a.c. operated model. Applications are considered.

11366 Preparation of Plastic Scintillation Phosphors. G. G. Eichholz and J. L. Horwood. *Review of Scientific Instruments*, v. 23, June 1952, p. 305.

Discussion of the above includes some typical compositions of phosphors.

11367* Mechanics of Materials. (German.) E. Siebel. *Zeitschrift des Vereines Deutscher Ingenieure*, v. 94, June 1, 1952, p. 465-471.

Shows that the mechanical behavior of crystalline materials under tensile stress can be ascribed to the interaction between shear strength and slip, flow, and fracture resistances and that thermal motion of the atoms reduces slip resistance and coherence of the material. Differences of effects of tension and compression under alternating stress are explained. Photographs, diagrams, and graphs. 13 ref.

11368* Velocity of Sound in Porous Media. (German.) Heinrich Labhart. *Zeitschrift für angewandte Mathematik and Physik*, v. 3, May 15, 1952, p. 205-211.

Measurements show the very close relation between sound velocity and pore volume in a Ni-Zn ferrite of fixed composition. A theoretical expression for sound velocity is derived that fits the experimental curve very well.

11369* Theory of the Dielectric Constants of Mixtures. (German.) Gottfried Eckart. *Zeitschrift für angewandte Physik*, v. 4, Apr. 1952, p. 134-136.

Formula derived for dielectric constant of binary mixtures of substances with different dielectric constants is based on Darwin and Hartree's results.

11370* Characterization of Noise and Noise Potentials. (German.) Heinz Bittel. *Zeitschrift für angewandte Physik*, v. 4, Apr. 1952, p. 137-146.

Mathematical discussion of above includes investigation of the conditions for deviations from the Gauss distribution. Validity of the Gauss function for resistors and tube noises is experimentally established. Measuring device described permits analysis of amplitude distribution of noise potentials and noises. Rectification of potentials of different amplitude distributions as well as effect of rectifier circuit and distribution function on rectified potential were investigated. Diagrams and graphs.

11371* Electrical and Spectroscopic Measurements on Low-Voltage Arcs. (German.) Jan Van Calker and Wilfried Maass. *Zeitschrift für angewandte Physik*, v. 4, May 1952, p. 161-166.

Fundamental considerations are presented. Data are tabulated and discussed.

11372* Adsorption on Semiconductors. (French.) P. Aigrain and C. Dugas. *Zeitschrift für Electrochemie; Berichte der Bunsengesellschaft für physikalische Chemie*, v. 56, Apr. 1952, p. 363-366.

Discusses the adsorption mechanism in electron exchange between the surface of a semiconductor and adsorbed atoms. Proposes a method of calculation of the adsorption energy, and of the number of adsorbed atoms. The role of foreign atoms in catalysis is indicated.

11373* The Mechanism of Chemical Adsorption From the Point of View of the Theory of Structural Defects. (German.) K. Hauffe and H. J. Engell. *Zeitschrift für Electrochemie; Berichte der Bunsengesellschaft für physikalische Chemie*, v. 56, Apr. 1952, p. 366-372; disc., p. 372-373.

Reviews the above on the basis of the literature. Discusses particularly the relationship between adsorption properties and electronic structure of the material, and the effect structural defects have on these factors. Various deductions from these considerations, particularly for semiconductors, are outlined. 15 ref.

11374* Electron Emission of a Silver Surface Caused by Iodine. (German.) H. Paproth, W. Rathje, and I. N. Stranski. *Zeitschrift für Electrochemie; Berichte der Bunsengesellschaft für physikalische Chemie*, v. 56, Apr. 1952, p. 409-413; disc., p. 413-414.

Describes experiments in which the emission of negative electrons was observed. Dependence of the emission upon voltage and temperature is described; nature of the emitted electrons is indicated. Proposes theory of so-called chemo-electric emission as an explanation for the phenomenon. 13 ref.

11375* New Investigations on Triboluminescence. (German.) G. Wolff, G. Gross, and I. N. Stranski. *Zeitschrift für Electrochemie; Berichte der Bunsengesellschaft für physikalische Chemie*, v. 56, Apr. 1952, p. 420-427; disc., p. 428.

Reviews the above on the basis of the literature. Discusses the origin of triboluminescence, the difference between permanent and temporary triboluminescence, and reasons for both. Includes micrographs and list of 172 triboluminescent substances. 14 ref.

11376* Multiple Dispersion of Electrons in Thin Layers. (German.) S. Leisegang. *Zeitschrift für Physik*, v. 132, no. 2, 1952, p. 183-194.

Moliere's method is used to compute angular dispersion of above as a function of ordinal index and thickness of electron-bombarded layers. Measurements of electron dispersion in celluloid, Al, Ag, and Au layers (100-1000 A thick) confirm the theory. Diagrams and graphs. 11 ref.

11377* New Contributions to the Problem of Magnetic Transformation. (German.) Friedrich Fraunberger. *Zeitschrift für Physik*, v. 132, no. 2, 1952, p. 212-220.

Shows that magnetic transformation occurs in several steps. Points out the relationship between magnetic state and characteristic temperature. Includes graphs. 16 ref.

11378* Calculation, Based on the Lattice Theory, of the Energy of Perturbing Centers in Simple Ionic Crystals. (German.) Peter Brauer. *Zeitschrift für Naturforschung*, v. 7a, May 1952, p. 372-379.

Mott and Littleton's basic results were applied to computation of distortion and polarization of rock-salt lattices formed by incorporation of a foreign ion and of the change of ionic energy. The problem of the incorporation of Tl in NaCl and KCl is discussed in detail and results found to agree with earlier experimental ones. Data are tabulated. 15 ref.

Miscellaneous Publications

11379 Some Aspects of the Biological Action of High Energy Radiations. Harvey M. Patt. "Annual Review of Nuclear Science. Vol. I." (Annual Reviews, Stanford, Calif.), p. 495-524. (QC780 An78)

Reviews above under the headings: mode of action, biological effectiveness, effects on growth, enzymes and metabolism, blood,

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immunity and infection, and general physiological effects. 205 ref.

11380 Extention to the Cases of Two Dimensional and Spherically Symmetric Flows of Two Particular Solutions to the Equations of Motion Governing Unsteady Flow in a Gas. Lorenzo Poggi. National Advisory Committee for Aeronautics, Technical Memorandum 1332, June 1952, 6 pages. (Translated from "Numero Speciale in Onore di Modesto Panetti", published by L'Aerotecnica, Associazione Tecnica Automobile, and La Termotecnica, Turin, Italy, Nov. 25, 1950.) (TL570 Un3tm)

11381 A Vector Study of Linearized Supersonic Flow; Applications to Nonplanar Problems. John C. Martin. National Advisory Committee for Aeronautics, Technical Note 2641, June 1952, 81 pages. (TL570 Un3t)

General expressions which relate velocity potential in the stream to conditions on the disturbing surfaces are derived. Problems of nonplanar systems are investigated, and methods are derived for solution of some simple nonplanar bodies. 15 ref.

11382 Calculation of Lift and Pitching Moments Due to Angle of Attack and Steady Pitching Velocity at Supersonic Speeds for Thin Sweptback Tapered Wings With Streamwise Tips and Supersonic Leading and Trailing Edges. John C. Martin, Kenneth Margolis, and Isabella Jeffreys. National Advisory Committee for Aeronautics, Technical Note 2699, June 1952, 116 pages. (TL570 Un3t)

11383 Diffusion of Heat From a Line Source in Isotropic Turbulence. Mahinder S. Uberoi and Stanley Corrsin. National Advisory Committee for Aeronautics, Technical Note 2710, June 1952, 90 pages. (TL570 Un3t)

An experimental and analytical study was made of some features of the turbulent heat diffusion behind a line-heated wire stretched perpendicular to a flowing isotropic turbulence. Mean temperature distributions were measured with systematic variations in wind speed, size of turbulence-producing grid, and downstream location of heat source. Nature of the temperature-fluctuation field was studied. Graphs. 31 ref.

11384 Use of the Boundary Layer of a Cone to Measure Supersonic Flow Inclination. Franklin K. Moore. National Advisory Committee for Aeronautics, Technical Note 2723, 21 pages. (TL570 Un3t)

An instrument is suggested for measurement of supersonic flow inclination, taking advantage of the effect of angle of attack on the meridional velocity profile of the laminar boundary layer on a cone. This effect may be measured by the difference of total pressure recorded by two probes pointing toward the apex and located in the plane of symmetry of the flow. Theoretical response to angle of attack is derived. Results of a single test are presented and discussed. They show that sensitivity is limited to angles of attack less than the cone semivertex angle. Effect of probe size is discussed. Equations presented permit the probes to be located in such a way that maximum sensitivity is obtained.

11385 Interaction of Oblique Shock Waves with Regions of Variable Pressure, Entropy, and Energy. W. E. Moeckel. National Advisory Committee for Aeronautics, Technical Note 2725, 34 pages. (TL570 Un3t)

Equations are derived for computing form of an oblique shock wave as it passes through supersonic regions in which static pressure, stagnation pressure, stagnation temperature, or their combinations are continuously variable.

11386 An Analysis of Supersonic Flow in the Region of the Leading Edge of Curved Airfoils, Including Charts for Determining Surface-Pressure Gradient and Shock-Wave Curvature. Samuel Kraus. National Advisory Committee for Aeronautics, Technical Note 2729, June 1952, 45 pages. (TL570 Un3t)

Results cover Mach numbers from 1.5 to infinity and deflection angles from zero up to those approaching shock detachment. Calculations of surface-pressure gradient and shock-wave curvature are also made for curved air-foils in supersonic flow of calorically imperfect, diatomic gas.

11387 Investigation of the Dependence of Stress Relaxation on Pressure for Nonmetallic, Crystalline Substances. (Russian.) I. A. Leskovich. "Izvestiia Sektora Fiziko-Khimicheskogo Analiza", v. 20 (Academy of Sciences of the USSR), p. 29-36. (QD453 Ak13i)

Tests were made on the above using α-trinitrotoluene. Data are tabulated and charted.

11388 Quarterly Progress Report. Solid-State and Molecular Theory Group, Massachusetts Institute of Technology, Apr. 15, 1952, 23 pages. (QC1 M38q)

Consists of the following sections: "A Soluble Problem in Energy Bands", J. C. Slater; "Self-Consistent Field Calculation for Cu^+", G. W. Pratt, Jr.; "Energy Bands in Solids", R. H. Parmenter; "Paramagnetic Energy Levels in Chrome Alum", W. H. Kleiner; "Molecular Orbital Calculations for the ClO_4^- Ion", G. F. Koster; "Theory of Molecular Oxygen", A. Meckler; "Wave Functions for the Diamond Structure", H. C. Schweinler; "Superlattice Stability", H. C. White; "Theory of Ferromagnetism", R. Kickuchi; and "Study of the Dielectric Constant and Conductivity of Germanium in a Resonant Cavity", Hilda H. T. Hsieh.

Books

11389 Theoretical Physics. Ed. 2. Georg Joos and Ira M. Freeman. 853 pages. 1950. Hafner Publishing Co., New York. (QC20 J74t2)

An advanced text. 4-page bibliography.

11390 Ultrasonic Physics. E. G. Richardson. 285 pages. 1952. Elsevier Publishing Co., New York. (QC243 R39u)

Devoted in particular to construction and use of ultrasonic interferometers as precision instruments. Describes results of past 2 decades and discusses critically theories proposed to explain them. Chapter bibliographies.

11391 Classical Mechanics. D. E. Rutherford. 200 pages. 1951. Interscience Publishers, New York. (QA805 R93c)

Provides a logical development of theoretical mechanics from Newton's Laws to Hamilton's Principle. Requirements of the physicist as well as the mathematician are kept in mind. Several examples of physical significance are included among the selected problems which are to be found at the end of each chapter.

11392 Grenzschicht-Theorie. (Boundary-Layer Theory.) Hermann Schlichting. 483 pages. 1951. G. Braun, Karlsruhe, Germany. (QA913 Sch39g)

The 4 parts deal with the basic laws of a viscous liquid, laminar boundary layers, change from laminar to turbulent flow, and turbulent boundary layers. Experimental methods and results are discussed and compared with theoretical predictions. Tables, graphs, diagrams, photographs, and chapter bibliographies.

11392a Analytical Mechanics for Engineers. Ed. 4. Fred B. Seely and Newton E. Ensign. 443 pages. 1952. John Wiley & Sons, New York. (QA805 Se35a4)

A textbook covering statics, kinematics, and kinetics. Includes numerous problems.

11393 Progress in Cosmic Ray Physics. J. G. Wilson, editor. 557 pages. 1952. North-Holland Publishing Co., Amsterdam. (QC485 W69p)

Seven comprehensive chapters by one or more of 11 contributors review specific aspects of the above. Each chapter is followed by a lengthy bibliography.

11394 Manual for the Illuminating Engineer on Large Size Perfect Diffusors. H. Zijl. 196 pages. 1951. N. V. Philips' Gloeilampenfabrieken (Philips Industries), Eindhoven, Netherland. (QC383 Z64m)

Presents thorough fundamental development of theory and practice of artificial illumination. Numerous graphs, diagrams, and tables.

11395 Annual Review of Nuclear Science. Vol. I. 645 pages. 1952. Annual Reviews, Stanford, Calif. (QC780 An78)

First in an annual series, the plan for which calls for the various fields of nuclear science to be covered periodically, keeping pace with major developments in all aspects of nuclear research. 26 articles cover different aspects, including applications of radiation and radioisotopes in a variety of fields.

See also:
10176 (energy losses and hysteresis in ferromagnetic materials)
10619 (detonation-wave oscillography)
10644 (helicopter aerodynamics)
11011 (fluorescence and phosphorescence of organic compounds)
11420 (pulse techniques in nuclear physics)
11479 (physics research at MIT—quarterly progress report)

33. ELECTRICITY AND ELECTRONICS

11396* Electrophotometer With Vacuum Cell and A.C. Amplification. (German.) H. Hinteregger. *Acta Physica Austriaca*, v. 5, no. 4, 1952, p. 496-503.

A photoemissive vacuum cell is used as an a.c. amplifying element the factor of which is controlled by illumination. The principle is explained by the fact that the tangent of the curves relating photocurrent to voltage becomes proportional to illumination, if the cell is run at a certain point of the space-charge region. Diagrams, graphs, and photographs.

11397* Frequency Measurements in the Microwave Region. (German.) Bernhard Koch. *Archiv für technisches Messen*, May 1952, p. 111-116.

Reviews specialized measuring processes for the above on the basis of the literature. Treats particularly the indirect method by means of a wavemeter, and direct measurement according to the principle of overlapping. Table contains frequencies and absorption coefficients of the main lines of the NH_3 spectrum. Diagrams. 46 ref.

11398* Magnetic Amplifiers. Properties of the Basic Forms With Respect to Their Application in Industrial Control Devices. (German.) Walter Schilling. *Archiv für technisches Messen*, June 1952, p. 139-142.

Describes the above on the basis of the literature. Discusses the basic forms of transductors, and various aspects of their operation. 21 ref.

11399* The Application of Molecular Resonance to Microwave Frequency Stabilization. H. R. L. Lamont and E. M. Hickin. *British Journal of Applied Physics*, v. 3, June 1952, p. 182-188.

A method is described of stabilizing the frequency of an oscillator by means of molecular absorptions which occur in the microwave spectrum of some gases. Circuit details are given of an apparatus used with ammonia at wavelengths near 1.25 cm., and factors affecting performance are discussed theoretically. Possibilities for other wavelengths are considered. 13 ref.

11400 Surface Losses in Electromagnetic Cavity Resonators. I. Paghis. *Canadian Journal of Physics*, v. 30, May 1952, p. 174-184.

In a study of the relation between surface roughness and resonator losses the effective skin resistance of brass was determined at microwave frequencies, by means of Q measurements. Micrographs, tables, graphs, and apparatus diagrams. 14 ref.

11401 Symmetrically Placed Inductive Posts in Rectangular Wave Guide. H. Gruenberg. *Canadian Journal of Physics*, v. 30, May 1952, p. 211-217.

A theoretical expression was derived for the susceptance of 2 symmetrically placed inductive posts in rectangular wave guides. Universal curves were drawn valid for all rectangular guides in their normal operating range, for different post diameters and offsets. Reasonable agreement was obtained with experiments at 10.7, 4.74, and 3.20 cm. wave lengths. Diagram and graphs.

11402* Reversible Cell Whose Electrolyte is a Crystal Vapor Deposited in a Thin Layer. (French.) Abdelhak Sator. *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, v. 234, June 4, 1952, p. 2283-2285.

Describes experiments with a cell whose electrolyte is a thin (1μ) crystal of $PbCl_2$. The positive pole is a AgCl-coated Ag electrode; the negative pole is Pb. Results are indicated.

11402a* Linear Circuit Theory and Servomechanism Design. Howard Hamer. *Electrical Engineering*, v. 71, July 1952, p. 614-615.

Discusses need for communication between design engineers and those engaged in research on feedback-control systems as well as the problems faced by and limitations imposed on design engineers.

11403* High-Temperature Dry-Type Transformer Economics. L. C. Whitman. *Electrical Engineering*, v. 71, July 1952, p. 618. (A condensation. To be published in *AIEE Transactions*, v. 71, 1952.)

Briefly discusses the above.

11404* Vacuum-Plastic-Filled Insulated Voltage Transformers. E. C. Wentz and F. B. Colby. *Electrical Engineering*, v. 71, July 1952, p. 631. (A condensation. To be published in full in *AIEE Transactions*, v. 71, 1952.)

Summarizes advantages, properties, and applications.

11405* Intermittent Faults in Aircraft Electric Systems. L. R. Larson, Mike Trbovich, and P. E. Toomire. *Electrical Engineering*, v. 71, July 1952, p. 634-639.

Intermittent faults were obtained experimentally in simulated 30-volt d.c., 120-volt d.c., and 120/208-volt 400-cycle a.c. electric systems to determine the approximate minimum fault current magnitude and duration. These are discussed along with ways of attaining partial and complete protection against faults.

11406* A New Permanent-Magnet Material of Nonstrategic Material. F. G. Brockman. *Electrical Engineering*, v. 71, July 1952, p. 644-647.

Co and Ni shortages highlight the introduction of permanent-magnet material which uses no strategic materials. Magnets composed of it display a high coercive force and excellent resistance to demagnetization. Like the ferrites, this new material is nonmetallic but is a permanent-magnet material, while the ferrites developed by Philips are magnetically soft. It is composed essentially of a compound having the formula $BaO{\cdot}6Fe_2O_3$ analogous to $PbFe_{12}O_{19}$ and $SrFe_{12}O_{19}$. All three possess similar magnetic properties but the barium compound is the practical and economical choice for commercial applications. 10 ref.

11407* Magnetic Amplifier Definitions. William H. Elliot. *Electrical Manufacturing*, v. 50, July 1952, p. 88-91, 252, 254.

Presents primary features and operating characteristics of these electrical-control elements in concise summary form. Circuit diagrams and tables. 14 ref.

11408* Feedback Control Fundamentals. O. W. Livingston. *Electrical Manufacturing*, v. 50, July 1952, p. 98-101, 258, 260, 262.

Presents basic methods of analysis for servomechanisms for both steady-state and transient performance with some simple mathematics helpful in evaluating system stability. Discusses design factors. Graphs and circuit diagrams.

11409* Wider Design Opportunities With the New Phenolics. Part II. Alex. E. Javitz. *Electrical Manufacturing*, v. 50, July 1952, p. 102-107, 264, 266, 268.

Describes following laminate types and gives properties and applications: low-loss; Al and Cu clad; postformed; low-pressure; and alkali-resistant. Information is given on the bonding of the metal-clad laminates. Tables and photographs. (To be continued.)

11410* Non-Magnetic Steel. C. T. Eakin. *Electrical Manufacturing*, v. 50, July 1952, p. 108-112, 268, 270, 272.

Information on 4 types of alloys available for electrical design. Covers basic metallurgy responsible for nonmagnetic properties, and various processes and properties. Alloy types are: Cr-Ni, C-Mn-Ni, and C-Mn steels; and C-Ni cast irons. Photographs and extensive table.

11411* Computer Solves Feedback Control Problems. *Electrical Manufacturing*, v. 50, July 1952, p. 116-117.

Graphical solutions of control-system differential equations are obtained with substantial savings in engineering time.

11412* Electronic Components in Great Britain. *Electrical Manufacturing*, v. 50, July 1952, p. 118-120.

Discusses new developments including metal-film resistors, ferrites, semiconductors, and subminiaturization. Mentions a Au-Ag alloy film resistor built up on paper by photomechanical techniques and a Sn-Sb oxide film resistor. Photographs.

33. *Electricity and Electronics*

11413* Connections for Aluminum Conductors. *Electrical Manufacturing*, v. 50, July 1952, p. 226, 228, 230, 232.

Report on an NEMA meeting concerning technical problems in terminating Al conductors to electrical equipment.

11414 Influence of the Impurities in the Foil, Electrolyte and Paper in the Electrolytic Capacitor. Gaston Muriset. *Journal of the Electrochemical Society*, v. 99, July 1952, p. 285-288.

A study of the above and their effect on the leakage current. Anode material considered is Al of different purities. Graphs. 12 ref.

11415 Fifty Years of Electric Insulation. *Journal of the Electrochemical Society*, v. 99, July 1952, p. 147c-154c.

Comprises a general introduction by Thomas D. Callinan and the following papers: "Dielectric Breakdown in Solid Insulation", J. J. Chapman; "Electric Insulation Developments: Cables", J. A. Szilard; "Electric Insulation Developments: Plastic Compounds", Leon L. Deer; "Vinyl Insulation", J. R. Bukey; and "Developments in the Mica Industry", Moses D. Heyman. 22 ref.

11416* Matric Theory Applied to Thermionic Valve Circuits. Sidney R. Deards. *Electronic Engineering*, v. 24, June 1952, p. 264-267.

11417* Peak-Noise Characteristics of Glow-Discharge Voltage-Regulator Tubes. H. Bache and F. A. Benson. *Electronic Engineering*, v. 24, June 1952, p. 278-279.

Data on 15 types. Tables and graphs.

11418* A Simple Capacitance-Meter Using a Crystal-Oscillator. V. H. Attree. *Electronic Engineering*, v. 24, June 1952, p. 284-286.

A 4 Mc./s. crystal-oscillator with a germanium rectifier and a milliammeter is used to detect small changes in a total capacitance of 200 pF. or less. Full-scale range is 1 pF. and changes of 0.01 pF. are easily detected. Measurements may be made at full sensitivity 10 sec. after switching on. Diagrams and graphs. 12 ref.

11419* Some Recently Developed Cold Cathode Glow Discharge Tubes and Associated Circuits. Part 3. (Concluded.) G. H. Hough and D. S. Ridler. *Electronic Engineering*, v. 24, June 1952, p. 272-276.

Deals with the Decade Counter G10/240E. Diagrams and graphs.

11420* Millimicrosecond Pulse Techniques. Part 2. A High Speed Oscillograph. N. F. Moody and G. J. R. McLusky. **Part 3. Time Expansion for Millimicrosecond Pulse Intervals.** N. F. Moody. **Part 4. A Multi-Channel Delayed Coincidence Analyser.** G. R. J. McLusky and N. F. Moody. *Electronic Engineering*, v. 24, June 1952, p. 287-294; July 1952, p. 330-333.

Part 2 outlines oscillographic equipment used to view fast waveforms, and details of the more specialized circuits are given. Part 3 is devoted to a description of apparatus for expanding millimicrosecond pulse intervals on an analog principle, and examples of application to laboratory measurements are suggested. Part 4 (July issue) deals with the use of high resolution coincidence mixers in nuclear physics, and describes the development of a multi-channel coincidence mixer system used in delayed coincidence analysis. Graphs and diagrams.

11421* Some New Image Convertor Tubes and Their Applications. J. A. Jenkins and R. A. Chippendale. *Electronic Engineering*, v. 24, July 1952, p. 302-307.

Describes tubes and following uses: high-speed photography; as wavelength transformers extending the range of spectrophotometers; infrared pyrometry and photography; brightness intensification; and color television. Graphs, photographs, and circuit and other diagrams. 17 ref.

11422* A Very High Impedance Valve Voltmeter. D. E. Brown and K. Kandiah. *Electronic Engineering*, v. 24, July 1952, p. 320-321.

Describes above, with 6 ranges from 10 to 500 volts full scale. Leakage resistance of the input terminal to earth is greater than 10^{14} ohms. Circuit diagrams.

11423* Metal Film Resistors. R. J. Heritage. *Electronic Engineering*, v. 24, July 1952, p. 324-327.

Shows that thin noble-metal films can be used to provide useful resistors of both the fixed and variable types which embody most of the properties expected of high-grade components. Discusses electrical properties, available production methods, and limitations. Describes experimental fixed and variable resistors made from 60% Au+40% Pt alloy on glass. Photographs.

11424* Mean-Noise Characteristics of Glow-Discharge Voltage-Regulator Tubes. H. Bache and F. A. Benson. *Electronic Engineering*, v. 24, July 1952, p. 328-329.

Gives above for 6 different types of tube: 85A1, 85A2, 7475, NT2, VR105, and VR150. Circuit diagrams and graphs.

11425 Binary Counter Uses Two Transistors. Robert L. Trent. *Electronics*, v. 25, July 1952, p. 100-101.

Various tinning and registry functions are provided by above with repition rate from 0 to 50 kc. It has stability without the usual sacrifice in sensitivity and permits either positive or negative triggering pulses to be used. Circuit diagrams.

11426 Distributed Amplifer Covers 10 to 360 MC. Howard Scharfman. *Electronics*, v. 25, July 1952, p. 113-115.

Describes above amplifier and test setup for evaluation. It provides 8-db gain, ±2 db., using readily available or easily fabricated parts. Applications include millimicrosecond oscillography, wideband i.f. and r.f. amplification and any other requiring extremely wideband amplification. Graphs, circuit diagrams, and photographs.

11427 Constant-Current D-C Amplifier. Donald McDonald. *Electronics*, v. 25, July 1952, p. 130-131.

Design of above reduces power-supply requirements because amplifier does not present varying load as do conventional circuits. Costs are cut by using only one high-voltage winding, one rectifier tube, and minimum of filtering components in power supply. Circuit diagrams.

11428 Nondistorting CRO Switch. William L. Firestone and Richard M. Bloniarz. *Electronics*, v. 25, July 1952, p. 139-141.

Oscilloscope accessory uses miniature receiving-type tubes and permits simultaneous viewing of two signals from subaudio to ultrasonic frequencies. Distortion of signals is low, and internal amplifiers provide gain up to 28 for stepping up low-voltage signals. Circuit diagram.

11429 Protecting Sensitive Current Meters. L. J. Giacoletto. *Electronics*, v. 25, July 1952, p. 142-143.

Describes how damage due to overload of microammeters and milliammeters can be prevented by use of electronic monitor circuits. Thyratron-operated relay opens the load circuit when voltage across the meter exceeds a predetermined value. Circuit diagrams.

11430 Scriptoscope Shows Messages on C-R Tube. A. G. Hubby and R. B. Watson. *Electronics*, v. 25, July 1952, p. 144-145.

Construction data and circuit details for above device which gives exact reproduction of handwriting on a long-persistence screen.

11431 Vacuum-Tube Analogy of Transistors. Hans E. Hollmann. *Electronics*, v. 25, July 1952, p. 156, 158, 162, 164, 169.

Describes and discusses a retarding-field tube, and other retarding-field units. Circuit diagrams.

11432 Voice and Sound Operated Relays. Karl Greif. *Electronics*, v. 25, July 1952, p. 176, 180, 184, 188, 192, 194.

Describes 2 simple sound-operated switches suitable for numerous applications. Carbon microphones are used. A 3rd circuit is given, utilizing a dynamic loudspeaker as a microphone.

11433 Design of a Low-Noise Pentode. P. Welch. *Electronics*, v. 25, July 1952, p. 194, 196, 198, 200, 202, 204.

Describes designing of British tube 6BR7 for service in the 1st stage of high-gain amplifiers and similar equipment.

11434* The Characteristics and Control of Rectifier-Motor Variable-Speed Drives. P. Bingley. *Institution of Electrical Engineers*, v. 99, pt. 2, June 1952, p. 189-202, disc., 202-206.

Deals with Hg-arc rectifiers, mainly of the glass-bulb type, for use with shunt-wound d.c. motors to provide variable-speed drives for industrial machinery. A knowledge of rectifier and motor theory is assumed. Numerous graphs and circuit diagrams. 89 ref.

11435* Two Electronic Resistance or Conductance Meters. L. B. Turner, *Institution of Electrical Engineers*, v. 99, pt. 2, June 1952, p. 209-216, disc., p. 216-219.

Two mains-fed instruments are described, each of which gives precise d.c. measurement of resistance. Range of resistance in the megohmeter is 10,000 ohms-1,200,000 megohms and in the microhmometer 260 ohms-330,000 megohms. Schematic drawings, circuit diagrams, tables, and graphs.

11436* Excess Voltages in Transformers and Reactors Connected to 3-Phase Electric Arc Furnaces. B. C. Robinson. *Institution of Electrical Engineers*, v. 99, pt. 2, June 1952, p. 271-287.

Detailed discussion of the above. Circuit diagrams, graphs, and oscillograms.

11437* A High Permeability Nickel Iron Alloy. *Engineer*, v. 193, June 6, 1952, p. 775.

Physical properties are given of above, a new alloy, "Permalloy F," which has a markedly rectangular hysteresis loop and a low value of coercive force, and is suitable as a core material for all forms of saturable reactors.

11438 Separability Conditions for the Laplace and Helmholtz Equations. Parry Moon and Domina Eberle Spencer. *Journal of the Franklin Institute*, v. 253, June 1952, p. 585-600.

In reference to potential theory, the Robertson method is extended to obtain necessary and sufficient conditions for R-separability of above equations. Tables.

11439* New High Voltage Laboratory, Indian Institute of Science. G. K. M. Pfestorf and D. J. Badkas. *Journal of the Indian Institute of Science*, v. 34, sec. B, Apr. 1952, p. 51-55.

Illustrated.

11440 A-C. Measurements to 10,000 Cps. Frank D. Weaver. *Instruments*, v. 25, June 1952, p. 757, 798, 800.

Briefly discusses various methods for the above, and their sources of error.

11441 Instrument Electronics. X. Oscillator Circuits. Milton H. Aronson. *Instruments*, v. 25, June 1952, p. 765-768, 788-792, 794, 796, 798.

Gives details of 20 basic oscillation circuits: the tickler coil, Hartley, Colpitts, tuned-plate tuned grid, ultraudion, electron-coupled, crystal-controlled, tuning-fork, magnetostriction, dynatron, transitron, phase-shift, Wien-bridge, sawtooth generator, multivibrator, Eccles-Jordan, beat-frequency, shock-excited, Klystron, and magnetron oscillators.

11442* A Wide-Range Oscillator in the Range From 8,000 to 15,000 MC. R. W. Wilmarth. *Proceedings of the I.R.E*, v. 40, July 1952, p. 813-817.

Describes above, a retarding field oscillator. Results for both inductive and capacitive tuning are discussed. Tuning curve, Rieke diagram, and apparatus diagrams.

11443* A High-Voltage, Cold-Cathode Rectifier. E. G. Linder, J. H. Coleman, and E. G. Apgar. *Proceedings of the I.R.E.*, v. 40, July 1952, p. 818-828.

Describes above. Gives theory and extensive experimental data. Found practical for output voltages up to 14 kv. and currents up to one ma. Useful especially for voltage-multiplier rectifier circuits. Photograph, diagrams, scale drawing, and graphs. 12 ref.

11444* An Experimental Study of Low-Power CW Magnetrons Having Few Segments. E. B. Callick. *Proceedings of the I.R.E.*, v. 40, July 1952, p. 836-843.

Shows that, apart from having intrinsically lower effciency, 2- and 4-segment magnetrons differ very little in characteristics from multisegment types if the ratio of cathode-to-anode diameter is the same in each case. Conditions are given for high efficiency of the few-segment types. Graphs and tube diagrams.

11445* Heater-Voltage Compensation for Alternating Current Amplifiers. N. W. Broten. *Proceedings of the I.R.E.*, v. 40, July 1952, p. 843-845.

Describes a feedback network for stabilizing tube characteristics and completely compensating for heater-voltage changes, and gives experimental results. Graphs and circuit diagram.

11446* The Magnetic Field of Circular Coils, and Its Application to Beta-Ray Spectroscopy. (French.) A. Moussa and J. F. Bellicard. *Journal des Recherches du Centre National de la Recherche Scientifique*, Mar. 1952, p. 131-135.

Proposes improvement in the present arrangement, by use of pairs of circular coils. Gives details of theoretical and experimental calculations. Charts and tables give values for a range of conditions.

11447 A Mathematical Analysis of Parallel-Connected Magnetic Amplifiers With Resistive Loads. Louis A. Pipes. *Journal of Applied Physics*, v. 23, June 1952, p. 625-629.

11448 Chemical Reactions in Barium Oxide on Tungsten Emitters. R. C. Hughes, P. P. Coppola, and H. T. Evans. *Journal of Applied Physics*, v. 23, June 1952, p. 635-641.

A study of the above. Results are of interest in such aspects as life of the cathode, and formation of interface layers possibly affecting electrical properties of the cathode. Apparatus diagrams, spectrograms, and x-radiograms. 14 ref.

11449 Characteristics of the High Current Tungsten Arc in Argon, Helium, and Their Mixtures. Merrill Skolnik and T. B. Jones. *Journal of Applied Physics*, v. 23, June 1952, p. 643-652.

A study of the above at atmospheric pressure. Tungsten-rod electrodes were used over the range 10-100 amp. Measurements of voltage-current and voltage-electrode separation characteristics were made along with plasma voltage gradients. Apparatus diagram, photographs, graphs, and oscillogram. 11 ref.

11450 Equivalences for the Analysis of Circuits With Small Nonlinearities. W. J. Cunningham. *Journal of Applied Physics*, v. 23, June 1952, p. 653-657.

Discusses two-terminal electric-circuit elements which are only slightly nonlinear and which are operating in the steady state. Such circuit elements can be described mathematically by a nonlinear equation in which the coefficients of the nonlinear terms are relatively small. Examples are vacuum tubes, crystal diodes, thermistors, and incandescent lamps. Includes experimental data. Table and graphs.

11451 Incandescent Lamp Bulbs in Voltage Stabilizers. W. J. Cunningham. *Journal of Applied Physics*, v. 23, June 1952, p. 658-662.

An analysis of the operation of the lamp is given which allows prediction of distortion for given operating conditions and shows effects of changes in frequency and current. Includes experimental data. Diagrams.

11452 Physical Processes in the L Cathode. D. L. Schaefer and John E. White. *Journal of Applied Physics*, v. 23, June 1952, p. 669-674.

A study to provide basic data on the L cathode. Considers: degree of surface coverage; evaporation rate; nature of evaporant; and mechanism of barium transfer. Diagrams and graphs. 12 ref.

11453 Electrical Noise From Instrument Cables Subjected to Shock and Vibration. Thomas A. Peris. *Journal of Applied Physics*, v. 23, June 1952, p. 674-680.

Reviews existing information on above. Presents explanatory theory, confirming data, and details of mechanism. Describes remedial procedure and also a method for making low-noise cables. Charts and diagrams. 14 ref.

11454 Dielectric Image Line. D. D. King. *Journal of Applied Physics*, v. 23, June 1952, p. 699-700.

Describes a modification of the dielectric wave guide found to offer several important advantages over the simple rod. Table and diagrams.

33. *Electricity and Electronics*

11455 Seat of Joshi Effect in A/C Silent Discharges. S. R. Khastgir. *Journal of Chemical Physics*, v. 20, June 1952, p. 1052-1053.

Reports the results of some experiments on the positive and negative Joshi effects in "sleeve"-discharge tubes containing iodine vapor and H_2.

11456 A Device for the Automatic Control of Electrical Power up to 2 kW. W. T. Bane and J. S. Appleby. *Journal of Scientific Instruments*, v. 29, June 1952, p. 174-176.

Comprises a closed-loop control system, a servo-motor, and an auto-transformer. Control of power from 50 to 2000 w. to an accuracy of ±¼% was achieved. Circuit and apparatus diagrams.

11457 Wave-Guide Systems With Negative Phase Velocities. L. B. Mullett and B. G. Loach. *Nature*, v. 169, June 14, 1952, p. 1011.

Brief discussion of the above. Graph shows typical behavior of loaded rectangular wave-guides above H_{01} cutoff and below H_{03}.

11458* Some Applications of Ferroxcube. W. Six. *Philips Technical Review*, v. 13, May 1952, p. 301-311.

Describes Ferroxcube, a ceramic magnetic material which consists of mixed crystals of simple cubic ferrites such as Mn-Zn ferrite. Applications discussed are its use in telephone inductor cores, radio tubes, and television high-tension generators.

11459 Effects of Rotor Design on A-C Motor Performance. F. A. List. *Product Engineering*, v. 23, July 1952, p. 124-129.

Describes NEMA squirrel-cage motor designs A through F and lists their applications. Similarly covers wound rotor motors. Table, diagrams, and performance curves.

11460* The Transfer Function of General Two Terminal-Pair RC Networks. Aaron Fialkow. *Quarterly of Applied Mathematics*, v. 10, July 1952, p. 113-127.

Mathematical presentation of the above.

11461* Rectifying Without Rectifiers. H. B. Conant. *Radio-Electronics*, v. 23, July 1952, p. 61-62.

Describes a new technique which frees a.c. voltage measurements from the limitations of metallic rectifiers. It uses metallic rectifier elements (or non-linear resistance materials like Thyrite) in a bridge arrangement. Circuit diagrams.

11462* Studies of Externally Heated Hot Cathode Arcs. Part II. The Anode-Glow Mode. W. M. Webster, E. O. Johnson, and L. Malter. *RCA Review*, v. 13, June 1952, p. 163-182.

A detailed treatment of the anode-glow mode wherein all ionization and excitation occur in a thin electron sheath close to the anode surface. The processes of ion generation and loss in a cylindrical diode are treated analytically and then equated to obtain an expression for the volt-ampere characteristic of the discharge.

11463* A 7000-Megacycle Developmental Magnetron for Frequency Modulation. H. K. Jenny. *RCA Review*, v. 13, June 1952, p. 202-223.

Describes the above for use in 7000-mc. microwave-relay systems. Performance data are included to show effects of applied voltages, magnetic fields, and tuner setting on power output, efficiency, frequency, and modulation. Graphs.

11464* Some New Ultra-High-Frequency Power Tubes. P. T. Smith. *RCA Review*, v. 13, June 1952, p. 224-238.

Experimental grounded-grid triodes and grounded-cathode tetrodes with identical cathodes and equivalent grids are described. Numerous detailed drawings.

11465* An Analysis of the Injection Locking of Magnetrons; Use in Amplitude-Modulated Transmitters. J. S. Donal, Jr., and K. K. N. Chang. *RCA Review*, v. 13, June 1952, p. 239-257.

Presents an analysis of the injection locking of a plate-modulated single-loop magnetron. Graphs and circuit diagrams.

11466 A Frequency Eliminating Transconductance Bridge. Walter C. Michels and Richard C. Barbera. *Review of Scientific Instruments*, v. 23, June 1952, p. 293-295.

Describes a simple transconductance bridge circuit, which eliminates completely a single frequency component and which suppresses in part a band of controllable width. A number of circuit variants are given; and applications of the device to ripple elimination and to band elimination amplifiers are discussed. Circuit diagrams.

11467 A Transmission-Line Pulse Inverter. Robert W. Rochelle. *Review of Scientific Instruments*, v. 23, June 1952, p. 298-300.

Features in the design of a typical pulse inverter for obtaining push-pull cathode-ray-tube deflection voltages from single-ended signals are presented. Diagrams and graphs.

11468* The Junction Transistor. Morgan Sparks. *Scientific American*, v. 187, July 1952, p. 29-32.

An account of underlying principles and present state of development of above, one of 2 forms of a device that amplifies electricity by the flow of electrons in a crystal. Chiefly deals with germanium. Diagrams.

11469* Impulse-Voltage Gradients in Transformer Coils. (Dutch.) P. Hoftijzer. *Smit Mededelingen*, v. 7, Apr.-June 1952, p. 33-44.

Brief discussion of standing-wave and traveling-wave analyses reveals that the latter describes intercoil stresses most clearly. Experimentally recorded oscillograms verify theoretical considerations. Includes study of stress distribution, effect of wave-front steepness, importance of gradual grading of reinforcement of insulation, and minimum dielectric strength between paper-covered conductors in oil. Graphs, diagrams, and oscillograms.

11470* The Spectral Character of Spark Discharges. (German.) K. Laqua. *Spectrochimica Acta*, v. 4, no. 6, 1952, p. 446-466.

Shows that an oscillatory spark discharge can be described sufficiently for its spectrochemical use, by energy dissipated and duration of the discharge. The energy dissipated determines the mass of matter volatilized and consequently the brightness of the spectrum. Duration of the discharge determines the character of the spectrum. Experimental apparatus is diagrammed. Typical results are charted, tabulated, and illustrated. 22 ref.

11471 Transistors: A Summary of Progress in Performance. *Tele-Tech*, v. 11, July 1952, p. 36-38, 102-106.

Comparison of characteristics of point-contact and junction units from 1949 to 1951. Improvements in reproducibility, reliability and designability are discussed. Diagrams, photographs, graphs, tables.

11472 Mode Interactions in Magnetrons. R. R. Moats. *Tele-Tech*, v. 11, July 1952, p. 39-41, 78, 88.

Discusses mode selection in pulse magnetrons and mode stability in either pulse or cw. magnetrons. Circuit diagrams and graphs.

11473 Signal-to-Noise Characteristics of Detectors. Allen H. Schooley and Samuel F. George. *Tele-Tech*, v. 11, July 1952, p. 60-63, 75.

Shows that data on linear, parabolic and semi-cubical detection of signals embedded in noise are expected to have a significant effect on television and radar-circuit design.

11474* Cathode-Follower Operation; Transient and Steady-State Performance With a Capacitive Load. A. J. Shimmins. *Wireless Engineer*, v. 29, June 1952, p. 155-163.

Considers methods of improving the performance of cathode-follower circuits. Main interest was in attempting to improve the transient response, particularly by use of inductive coupling circuits. Graphs and circuit diagrams.

11475* Fine-Wire Resistors for Measuring and Control Purposes. Computations and Applications. (German.) Otto Schultze. *Zeitschrift des Vereines Deutscher Ingenieure*, v. 94, June 1, 1952, p. 473-480.

Describes method of computing size of wire of given alloys for specific resistors and discusses some new uses of fine-wire resistors. Illustrations and graphs.

11476* On the Inertia of the Forward Conductivity of Germanium Diodes. (German.) Th. Einsele. *Zeitschrift für angewandte Physik*, v. 4, May 1952, p. 183-185.

Reports measurements on germanium diodes with square-wave pulses of very small impulse ratios, which indicate an inertia of the forward conductivity, especially in highly blocking diodes. Diagrams and graphs.

11477* Measuring the Resistance of Thin Insulating Layers Between Gold Contacts in the Region of the Tunnel Effect. (German.) Isolde Dietrich. *Zeitschrift für Physik*, v. 132, no. 2, 1952, p. 231-238.

Measurements of specific skin resistance at the contact as a function of thickness of the intermediate layer shows that up to 100A thickness, resistance is determined by the tunnel effect. Illustrations, graphs, and references.

Miscellaneous Publications

11478 Iron Powder Materials in High Frequency Transformers for Military Equipment. H. W. Lord. *Metal Powder Association*, "Proceedings Seventh Annual Meeting", 1951, p. 22-28; discussion, p. 28-29. (TN695 M56p)

Discusses properties and design of above transformers. Describes advantages of ferrite cores over iron-powder cores.

11479 Quarterly Progress Report. Research Laboratory of Electronics, Massachusetts Institute of Technology, Apr. 15, 1952, 93 pages. (TK161 M38q)

Includes report of work in the following fields: electron-emission problems; oxide-coated cathodes; physical electronics of the solid state; microwave gaseous discharges; quantum mechanics of solids; electrical properties of germanium at microwave frequencies; low-temperature physics; specific heat and thermal conductivity of magnesium; thermal properties of metals measured by a pulse technique; microwave spectroscopy; molecular-beam research; magnetic properties of solids; magnetron and microwave tube development; traveling-wave amplifiers; communication research; and analog-computer research.

11479a* Visibility of Hertzian Waves. (Russian.) D. I. Penner. "Uchenye Zapiski. Vypusk 134. Fizika. Kniga Piataia" (Scientific Records. Vol. 134. Physics. Vol. 5), Lomonsov's Moscow State University, 1949, p. 153-162.

A study was made of viewing and photographing of centimeter Hertzian waves. Equipment is described and test results are illustrated. 15 ref.

Books

11480 Practical Industrial Electronics. Ed. 1. F. A. Annett. 381 pages. 1952. McGraw-Hill, New York. (TK7815 An76p)

Written especially for operating engineers and electricians confronted with installation, operation, and maintenance of electronic equipment, and having little previous training in the subject. Covers the electron itself, the various tubes, the fundamental circuits, and performance of many different control devices. Electrical fundamentals and elementary circuits are treated in separate chapters. Based on a series of articles first published in *Power*.

11481 Terrestrial Radio Waves; Theory of Propagation. H. Bremmer. 336 pages. 1949. Elsevier Publishing Co., New York. (QC661 B75t)

Describes mathematical methods by which the electromagnetic field of a radio transmitter can be computed, taking into account curvature of the earth's surface. The 1st part deals with theory of a homogeneous atmosphere. In the 2nd part, the theory is extended to an inhomogeneous atmosphere.

11482 TV and Electronics as a Career. Ira Kamen, Richard H. Dorf, W. Hollander Bohlke, Raymond W. Peterson, and J. R. Poppele. 326 pages. 1951. John F. Rider Publisher, Inc., 480 Canal St., New York. (TK7845 K12t)

Describes features of jobs of various types in above fields, and tells how to become qualified for and to obtain them.

11483 Measurements at Centimeter Wavelength. Donald D. King. 327 pages. 1952. D. Van Nostrand Co., New York. (TK275 K58m)

Emphasizes the importance of transmission-line theory in centimeter-wave measurements. Wherever possible, the practical formulas are related to a collection of basic line equations. Chapter headings are: Transmissions of Power at Centimeter Wavelength; Measurement of Centimeter-Wave Power; Frequency, Wavelength and Waveform Measurement; Generators; Impedance Measurement; and Radiation Measurements. Footnote references.

11484 Radio Antenna Engineering. Ed. 1. 563 pages. 1952. Edmund A. Laport. McGraw-Hill, New York. (TK6565.A6 L31r)

Deals with antennas made of wires, masts, and towers with frequencies up to 30 mc. Includes some of the more advanced designs suggested by vhf. and uhf. techniques. Both receiving and transmitting antennas used in point-to-point, ground-to-air, and military communications, as well as in broadcasting, are thoroughly covered. Treats radiation, circuital, and mechanical-engineering aspects separately, for each type of antenna.

11485 Advanced Theory of Waveguides. L. Lewin. 192 pages. 1951. Iliffe & Sons, Ltd., London. (QC661 L58a)

Covers Electromagnetic Theory and Its Application to Waveguides; Cylindrical Post in Waveguides; Diaphragms in Waveguides; The Tuned Post and the Tuned Window; Waveguide Steps, T-Junctions, and Tapers; Radiation from Waveguides; and Propagation in Loaded and Corrugated Guides. 23-page bibliography.

11486* Transient Electric Currents. Ed. 2. Hugh Hildreth Skilling. 361 pages. 1952. McGraw-Hill, New York. (TK3226 Sk33t2)

Treats the general methods of solution of transient problems with many specific examples. All necessary mathematics beyond ordinary calculus is carefully explained. One of the major purposes of this edition is to present the Laplace transformation method in addition to the "classic" method.

11487 Small Commutator Motors. Kennard C. Graham. 283 pages. 1952. American Technical Society, Chicago. (TK4057 G76s)

Covers both d.c. and a.c. current motors which use a commutator. As each step is explained, many tested suggestions and practical time-saving devices are added which are usually acquired only after long experience in the field. More than 60 carefully drawn or specially posed illustrations on armature winding aid in developing the necessary techniques and skills.

11488 Proceedings of a Conference on Centimetric Aerials for Marine Navigational Radar. 150 pages. 1952. Her Majesty's Stationery Office, London. (TK6575 C76p)

13 papers and accompanying discussion. Meeting held June 15-16, 1950, in London.

See also:

10063 (metal spraying in electrical manufacturing)
10476 (electrical strain-gage circuits)
10479 (sintering of thermistor flakes)
10523 (static magnetic matrix memory)
10549 (specifications of metals used in electronics)
10564 (AIEE-IRE computer conference)
10599 (electrolytic conversion of coal to electricity)
10680 (automobile ignition systems—book)
10850 (inhibited transformer oils)
10851 (transformer-oil stability)
11302 (piezoelectric transducers for ultrasonic delay lines)
11370 (electron-tube noises)
11514 (U. S. railroad electrification prospects)

34. GRAPHIC ARTS

11489* Resolving Ability of Photographic Layers and the Resolving Power of the Eye at Low Values of Contrast. (Russian.) G. A. Istomin. *Doklady Akademii Nauk SSSR*, new ser., v. 84, May 11, 1952, p. 273-275.

Experiments were made on the above with various levels of contrast between the test object and the background. Data are charted. 10 ref.

11490* NPIRI Planetary Rubometer. W. C. Walker and A. C. Zettlemoyer. *American Ink Maker*, v. 30, June 1952, p. 59-61, 113.

Gives details of new laboratory apparatus for investigation of the rub-out resistance of printing inks.

34. *Graphic Arts*

11491* Pre-Etching and Coating in Lithographic Platemaking. Charles W. Latham. *American Printer*, v. 133, July 1952, p. 44-45, 54, 56, 58, 60, 62.

Gives details of above processes. Includes recommended procedures, solutions, etc.

11492 Ferromagnetography—High-Speed Printing With Shaped Magnetic Fields. T. M. Berry and J. P. Hanna. *General Electric Review*, v. 55, July 1952, p. 20-22, 61.

General Electric development of a new and basic principle in printing. Written text and pictures are reproduced by: forming magnetic images on thin sheets of permanent-magnetic material; making these images visible by deposition of tiny ferromagnetic particles and transferring these particles to a medium such as paper. These steps are analogous to platemaking, inking, and printing in the graphic arts.

11493 The Photographic Latent Image as a Nucleation Process from the Solid Phase. J. H. Webb. *Industrial and Engineering Chemistry*, v. 44, June 1952, p. 1331-1335.

The latent image and its formation are discussed from the standpoint of the electronic and ionic properties of crystals. Micrographs. 14 ref.

11494* New Equipment and Paper for a Positive Photocopy Process. Fred A. Tompkins. *International Blue Printer*, v. 25, July 1952, p. 26-28, 58.

Discusses the Eastman Kodak Company's experimental results on reversal processing as an attempt to eliminate negatives in photocopying.

11495* Offset Lithography Behind the Iron Curtain. L. K. Straszewicz. *Modern Lithography*, v. 20, June 1952, p. 42-43, 137, 139.

An analysis of the Soviet trade magazine *Graphic Trade* indicates a retarded state-owned industry. Describes bureaucratic red tape and strict controls over workers and management.

11496 Photometric Papers Sensitive Only to Short Wave Ultraviolet. Lyman Chalkley, *Journal of the Optical Society of America*, v. 42, June 1952, p. 387-392.

Describes work which resulted in development of photosensitive papers that respond only to the shorter wave ultraviolet and thus provide materials for recording and measuring this region. The sensitized papers print out fully formed, permanent images. Materials are described that are sensitive to 3250A and shorter and to 3350A and shorter wavelengths but are quite unaffected by sunlight through a colorless glass such as Corning 7380.

11497 A Photographic Low Intensity Desensitization Effect. R. E. Maurer and J. A. C. Yule. *Journal of the Optical Society of America*, v. 42, June 1952, p. 402-408.

Above new photographic phenomenon is described. Practical applications of the new effect as a reversal process and for color correction in reproducing colored originals are suggested. Tables and graphs.

11498* High-Presssure Mercury Vapour Lamps for Photo-Copying Processes. W. Elenbaas and K. R. Labberte. *Philips Technical Review*, v. 13, May 1952, p. 323-327.

Describes in detail the use of the above lamp in photo-copying. Photographs and tables.

11499* Phosphor-Type Photoconductive Coatings for Continuous Tone Electrostatic Electrophotography. Eugene Wainer. *Photographic Engineering*, v. 3, no. 1, 1952, p. 12-22.

Several processes and methods for "dry photography" are analyzed and compared and the current terminology is given. The highly specialized characteristics required of photoconductors for use in reproduction work are outlined and comparisons made of the various available conductors. The Carlson and Kallman Processes are both described in detail. Numerous graphs.

11500* Photographic Engineering 1951: A Review. Frank Smith. *Photographic Engineering*, v. 3, no. 1, 1952, p. 23-31.

Advances in this field are reviewed. Among these, new developments such as photosensitive vinyls; ferrography; Polaroid Land ultra high-speed film; photography on Al; "Wet Process" autoradiography; magnetic pictures on tape, and others.

11501* The Theory of the Half-Tone Screen: A Study in Diffraction. V. G. W. Harrison. *Photographic Journal*, v. 92B, May-June 1952, p. 74-91.

A new theory of the formation of screen negatives with the common types of cross-line screens is developed and confirmed experimentally. Recommendations for use of the screen are given and explained theoretically. 18 ref.

11502* A New Approach to the Photographic Problems of Colour Photo-Litho. D. C. Gresham. *Photographic Journal*, v. 92B, May-June 1952, p. 91-102.

Describes process by which screen positives are made directly from monochrome or colored originals. Simultaneous tone and color correction are obtained. Theory and practice of the process are discussed.

11503* Plastic Printing Plates. Axel Lundbye. *Printing Equipment Engineer*, v. 82, June 1952, p. 52-62; July 1952, p. 22-24.

Technical description of the making of rubber, thermoplastic, and thermosetting printing plates, together with discussion of aniline rotary printing presses. (To be continued.)

11504* Fluorescence Indicators in Combination With Solid Luminophors for Control of Photographic Baths in the Dark. (German.) J. Rzymkowski. *Fresenius' Zeitschrift für analytische Chemie*, v. 135, no. 6, 1952, p. 409-412.

Shows that the pH of a fixing bath can be controlled in the dark with "pyranin" which is caused to fluoresce by a solid luminophor. Procedure of testing the fixing bath is described.

Books

11505 The Art and Technique of Photo-Engraving. Ed. 3. Julien J. Soubiran. 104 pages. Horan Engraving Co., New York. (TR970 So81a2)

A practical manual. Covers the various steps in the process. Includes color plates, various types of photoengraving, duplicating processes, preparation of copy, and history.

See also:
10884 (printing—book)

35. STATISTICS AND ECONOMICS

11506* Consumption of Commercial Fertilizers in the U. S., 1950-51. Walter Scholl and H. M. Wallace. *Agricultural Chemicals*, v. 7, June 1952, p. 33-40.

Detailed coverage of the above. Data are given in tables and map-graphs.

11507 Light Metals Face a Busy Future. Charles M. Craighead. *Battelle Technical Review*, v. 1, June 1952, p. 65-66.

Discusses prospects for expanded use of Al and Mg and their alloys, as well as present and potential raw-material and power sources (the latter for reduction of Al_2O_3 to Al).

11508* Significant Developments in the Canadian Oil and Gas Industry During 1951. W. B. Dingle. *Canadian Mining and Metallurgical Bulletin*, v. 45, June 1952, p. 340-346; *Transactions of the Canadian Institute of Mining and Metallurgy*, v. 55, p. 226-232.

Discusses the above. Much pertinent data is given in graphs and tables.

11509 What *Can* Happen by 1962? *Chemical Engineering*, v. 59, June 1952, p. 389-390, 392-393.

Considers the outlook for the process industries, including metalworking, based on a detailed survey made by McGraw-Hill's Dept. of Economics. Charts.

11510 Canada. New Giant of the North. M. L. Kastens and William Q. Hull. *Chemical and Engineering News*, v. 30, June 16, 1952, p. 2478-2483; June 23, 1952, p. 2592-2596; June 30, 1952, p. 2692-2697.

Economic survey of the Canadian chemical industry. Tables and graphs.

11511 Foundation for Growth and Security. *Chemical and Engineering News*, v. 30, July 7, 1952, p. 2798-2800, 2873.

Reviews first volume of series of reports prepared by the President's Materials Policy Commission. Graphs show present status and future prospects of U. S. materials supply and consumption. Recommendations are given.

11512 The Outlook for Energy Sources. *Chemical and Engineering News*, v. 30, July 14, 1952, p. 2891-2893, 2959-2960.

Second of 4 articles based on the 5-vol. report of the President's Materials Policy Commission. Indicates that petroleum resources are the only domestic energy source in insufficient supply to meet soaring energy needs of U. S. during next 25 yrs. Graphs.

11513* Canadian Petrochemical Developments. F. K. Rogers. *Engineering Journal*, v. 35, June 1952, p. 607-609, 620.

Deals with origin, growth, and future development of the petrochemical industry. Gives list of present and planned facilities.

11514 Are We Ready for Railroad Electrification in the U. S.? John C. Aydelott. *General Electric Review*, v. 55, July 1952, p. 40-45.

Discusses economic and technological factors. Describes European experiences.

11515 Facts and Figures for the Chemical Process Industries. Maurice F. Crass, Jr. *Industrial and Engineering Chemistry*, v. 44, June 1952, p. 1193-1256.

Third biennial edition of this feature. 11 articles on various economic and resource aspects. Numerous graphs and tables.

11516 Minerals: Better Get Smart or Go Broke. *Iron Age*, v. 169, June 26, 1952, p. 55-56.

Statistical report on the critical shortage of certain minerals in the U. S. Table of pertinent data includes estimated future trend of mineral consumption.

11517 Price-Volume Ratios for Plastics and Metals. *Materials & Methods*, v. 35, June 1952, p. 137.

The above information presented graphically.

11518* Tinplate Demand and Supply. *Metal Bulletin*, June 6, 1952, p. 17-20.

Based on an examination, by J. Ryan, of likely supply and demand for tinplate throughout the world during the next 4 yrs. in order to estimate whether or not the current increases in tinplate manufacturing capacity will be sufficient to meet the demand. Tables.

11519* The French Iron and Steel Industry. *Metal Bulletin*, June 13, 1952, p. 13-20.

Impressions of a recent visit to the Lorraine and Nord steel areas of France.

11520* Point IV—Medieval Mining Frontiers Pushed Back. Alan Probert. *Mining Engineering*, v. 4, July 1952, p. 661-665.

Point Four mineral projects are wholly devoted to technical assistance in cooperation with other governments and have no direct responsibility for procurement. The objective of the program is to impart American skills and techniques directly to the peoples of industrially underdeveloped countries. Discusses mineral status of and progress in Brazil, Nepal, India, Mexico, Bolivia, and Colombia. Photographs.

11521* Newfoundland Explores Its Mineral Wealth. George G. Thomas. *Mining Engineering*, v. 4, July 1952, p. 672-673.

General discussion of the fast-growing interest in the mineral wealth and mineral mining of Newfoundland.

11522* Yugoslav Mining Expands With Metals Going to "Free World". P. J. Sergeant. *Mining World*, v. 14, July 1952, p. 32-35.

A personal tour and survey of major Yugoslavian mining areas confirms recent reports of rapid expansion and growing exports of nonferrous metals from this country.

11523* Interview with Kaiser Aluminum's Bert Inch. *Modern Metals*, v. 8, June 1952, p. 29-30, 32.

Vice-President of Kaiser Aluminum Co. Chemical Sales, Inc., answers pertinent questions concerning several specific aspects of the immediate and long-term outlook for Al.

11524* "Czar" Sam Anderson Discusses the Aluminum Supply Outlook. *Modern Metals*, v. 8, June 1952, p. 55-56, 58, 60-61.

Mr. Anderson takes up questions concerning the rise in civilian Al demand, long-term military requirements, further expansion of U. S. productive capacity, increased imports from Canada, and the impact of all these factors on the accumulation of an Al stockpile. Results of recent government-industry meetings are also included. Graphs.

11525 Fuels and Energy Supply. Clyde Williams. *Monthly Business Review* (Federal Reserve Bank of Cleveland), v. 34, July 1952, p. 11.

Discusses present and potential fuel supplies and other energy sources. Means of improving the situation through research are indicated.

11526* Scientific Developments in Industrial Engineering. David Bendel Hertz. *Transactions of the New York Academy of Sciences*, ser. 2, v. 14, Apr. 1952, p. 246-250.

Outlines 4 modern models of industrial operations and discusses concepts involved in solving the management problems described by these models.

11527* Output of Copper in 1951, by Producers. David N. Skillings. *Skillings' Mining Review*, v. 41, July 12, 1952, p. 1-2.

11528* The European Pulp and Paper Industry Moves Ahead. Joseph E. Atchison. *Tappi*, v. 35, June 1952, p. 10A, 12A, 14A, 16A.

An economic survey with special reference to Austria.

11529* The Manganese Situation. Rowland King. *Western Miner*, v. 25, June 1952, p. 54.

Discusses the present status of the Mn-ore situation in the U. S. Compares domestic and foreign production for the past decade. Statistics from the Minerals Yearbook of the U. S. Bureau of Mines.

Miscellaneous Publications

11530 The Gas Industry in France: Its Evolution, Programme and Prospects. J. Kec. Institution of Gas Engineers, Copyright Publication 404, 1952, 20 pages. (TP700 In8c)

See also:
11103 (economics of plastic sheet forming)
11535 (statistics in the Soviet Union)

36. MISCELLANEOUS

11531 Forrestal Center to Study Fundamentals. David A. Anderton. *Aviation Week*, v. 56, June 23, 1952, p. 21, 23, 25-26.

Outlines research program at the James Forrestal Research Center, Princeton, N. J., which includes studies of flow, aeronautical engineering, and flight problems.

11532* Problems in the Search for Microorganisms Producing Antibiotics. J. B. Routien and A. C. Finlay. *Bacteriological Reviews*, v. 16, June 1952, p. 51-67.

A review. 73 ref.

11533 Geophysical Exploration. Peter Dehlinger. *Battelle Technical Review*, v. 1, June 1952, p. 60-64.

Surveys various methods for the above, used to detect the presence of petroleum and mineral raw materials. Points out striking similarity in the methods, objectives, and to some extent, techniques, between the fields of geophysical exploration and nondestructive testing. 12 ref.

11534 The Sensitivity of Actinomyces Israeli to Antibiotics. Lawrence P. Garrod. *British Medical Journal*, June 14, 1952, p. 1263-1264.

The mean minimum inhibitory concentrations of 5 antibiotics for 12 strains of above fungus were found. 16 ref.

11535* Russian Science Symposium. VI. Statistics in the Soviet Union. Stuart A. Rice. *Bulletin of the Atomic Scientists*, v. 8, June 1952, p. 159-162.

Author tells why he believes that distortion of statistics by

36. *Miscellaneous*

party-line philosophy is more apparent in theoretical interpretation than in actual Soviet practice.

11536 Soviet Physics and Chemistry. John Turkevich. *Chemical and Engineering News*, v. 30, July 7, 1952, p. 2792-2797.

Outlines the history of development of science in the U. S. S. R. Divisions of the Academy of Sciences are briefly outlined. Reviews the various chemical and physical periodicals published in the U. S. S. R.; and gives extensive information concerning the specialties of various Soviet scientific personalities.

11537 Mechanized System Launches New Era for Literature Searching. *Chemical and Engineering News*, v. 30, July 7, 1952, p. 2806, 2808, 2810.

Reviews proceedings of recent MIT meeting on mechanized literature searching and associated problems. Special attention was given to a new IBM machine and search system. Also describes exploratory work on coding systems, development of "machine language", a proposed ultra-high-speed electronic scanner, and the scientific literature problem which makes development of mechanized methods obligatory.

11538* Engineering and Metallurgical Research by Babcock & Wilcox, Limited, at Renfrew. *Engineering*, v. 173, June 27, 1952, p. 797-801.

Rather detailed illustrated description of research program of above English company primarily concerned with boiler design but covering a wide variety of developments in design, measurement techniques, etc.

11539* R. C. A. F. Research and Development. J. J. Green. *Engineering Journal*, v. 35, June 1952, p. 615-620.

Deals with development of Canadian air research during past 30 yrs. and the current program. Topics discussed include: guided missiles and their aerodynamics, and operational research.

11540* What Should I Know When I Travel Abroad? *International Markets*, June 1952, p. 6-7, 28-32.

A "question-and-answer" presentation prepared by American Heritage Foundation.

11541* Experimental Evaluation of Well Perforation Methods as Applied to Hard Limestone. Henry Lewelling. *Journal of Petroleum Technology*, v. 4, June 1952; *Transactions of the American Institute of Mining and Metallurgical Engineers*, v. 195, 1952, p. 163-168; disc., p. 168.

An experimental investigation of the relative effectiveness of standard bullets and "shaped charges" in perforating dense, hard formations is reported. A method is described which simulates the conditions under which a shot is normally fired. Results are evaluated on the basis of depth of penetration, extent of fracturing, extent and nature of formation damage, and other physical characteristics.

11542 High Strength Aluminum Alloys. C. Wilson. *Metal Industry*, v. 80, May 23, 1952, p. 419-421; May 30, 1952, p. 445-449.

May 23 issue gives information on heat treatment, corrosion, and extrusion. May 30 issue deals with effects of solution and precipitation treatments on mechanical properties. Photographs, tables, and graphs.

11543* Laboratory of Electrochemistry, Chemistry, Physics, and Metallurgy of the Polytechnic Institute of Milan. (Italian.) R. Piontelli. *Metallurgia Italiana*, v. 44, May 1952, p. 184-192.

Illustrated description of facilities of the different sections. List of publications, 1948-1952.

11544 A Dictionary of Metallurgy. A. D. Merriman and J. S. Bowden. *Metal Treatment and Drop Forging*, v. 19, May 1952, p. 217-224, June 1952, p. 265-272.

May issue covers "Brown & Sharp Gauge" to "Celtium". June issue covers "Cement" to "Coarse Metal". (To be continued.)

11545* Experiments With an Underground Auger. J. P. Newell and R. W. Storey. *Mining Engineering*, v. 4, July 1952; *Transactions of the American Institute of Mining and Metallurgical Engineers*, v. 193, 1952, p. 677-681.

Deals with a trial operation in underground auger mining with a machine especially developed for this purpose. The experiment was carried out in a thin coal seam with bad roof conditions, over a 10-mo. period. Photographs, tables, and diagrams.

11546 Air Drilling Solves Lost-Circulation Problems of Mountain-Top Field. D. H. Stormont. *Oil and Gas Journal*, v. 51, July 7, 1952, p. 60-61, 93.

Gives details of air-drilling technique used in reference to the above. Compressed air was used: in circulating; as a bit-cooling medium; and in reaming, washing over, drilling around, and fishing operations. Drawing and photographs.

11547* Principles and Tendencies of the Development of the Natural Sciences in Soviet Russia. (German.) Arnold Buchholz. *Ost Europa*, v. 2, June 1952, p. 161-168.

11548* The Future of Industrial Research and Development in Great Britain. R. S. Edwards. *Research*, v. 5, June 1952, p. 247-255.

Discusses the principal factors influencing industrial research and development, and compares the American and Swiss scenes with the British position.

11549 The General Organization of Technical and Scientific Societies in Great Britain and Switzerland. *Sheet Metal Industries*, v. 29, July 1952, p. 600-606.

A report of a joint technical conference held in Zurich recently. Only the Swiss societies are dealt with. Activities of a number of these are given briefly.

11550 Institute Sperimentale dei Metalli Leggeri: A Review of the Activities of the Institute During 1951. M. D. J. Brisby. *Sheet Metal Indsutries*, v. 29, July 1952, p. 607-608.

11551* Work of the Verein Deutscher Eisenhüttenleute in 1951. (German.) *Stahl und Eisen*, v. 72, June 19, 1952, p. 733-758.

Extensive review of organization and research of German iron and steel organization. 223 ref.

11552* Atomic Energy in Norway. (Norwegian.) Gunnar Randers. *Teknisk Ukeblad*, v. 99, Jan. 3, 1952, p. 3-8.

An illustrated report on Norway's efforts of developing atomic energy.

11553 Service Research. Possibilities of the A.T.A.-T.N.O. (Dutch.) J. Kreyger. *TNO Nieuws*, v. 6, Dec. 1951, p. 405-413.

Briefly explains objectives of above research organization and discusses the necessity of experimental drying equipment. Research results on drying problems are graphed and various designs of drying equipment are described and illustrated.

Miscellaneous Publications

11554 Radioisotopes in Biochemical and Medical Research. Claude A. Villee. "Annual Review of Nuclear Science. Vol. I." (Annual Reviews, Stanford, Calif.), p. 525-568. (QC780 An78)

348 references.

11555 Problems for the Numerical Analysis of the Future. National Bureau of Standards, Applied Mathematics Series 15, June 29, 1951, 21 pages. (QA297 Un3p)

Four papers given at Symposia on Modern Calculating Machinery and Numerical Methods, University of California, July 29-31, 1948: "Some Unsolved Problems in Numerical Analysis", Douglas R. Hartree; "Numerical Calculations in Nonlinear Mechanics", S. Lefschetz; "Wave Propagation in Hydrodynamics and Electrodynamics", Bernard Friedman; and "Linear Programing", George B. Dantzig.

11556* TNO, 1950-1951. 66 pages. T.N.O., s'Gravenhage, Netherlands.

Illustrated brochure describing activities of above Dutch research organization, which is divided into 7 main groups and 56 subgroups.

Books

11557 Physiologische Chemie. Ein Lehr- und Handbuch für Arzte, Biologen, und Chemiker. Erster Band. Die Stoffe.

(Physiological Chemistry. A Textbook and Handbook for Physicians, Biologists, and Chemists. Vol. I. Materials.) 1600 pages. 1951. Springer Verlag, Berlin, Germany. (QP514 F61p)

Begins with discussion of the physicochemical principles of biological processes in vegetable and animal organisms. A comprehensive treatise on composition, properties, functions, and behavior of inorganic and organic substances required for growth, metabolism, and control of vital functions. Tables, graphs, and numerous references.

11558 Red Metal: The Calumet and Hecla Story. C. Harry Benedict. 257 pages. 1952. University of Michigan Press, Ann Arbor. (HD9539.C72 B43r)

This book gives the dramatic story of the past linked to the present by the energies and fortunes of many men who move in colorful realism through its pages. It is a story not only of the fortunes of men but also of their misfortunes, foresight and mistakes, successes and failures, and all the conflicting forces of 85 years of American enterprise relating to the largest of the copper mines of the Michigan Upper Peninsula.

11559 Cottrell: Samaritan of Science. Frank Cameron. 414 pages. 1952. Doubleday & Co., Garden City, N. Y. (QD22.C63 C14c)

Biography of one of the leading scientific figures of the present century. His many patents were turned over to a nonprofit foundation for advancement of science, The Research Corporation, today supporting hundreds of projects with the funds which he and others might have kept for personal use. His work was mainly concerned with electrical precipitation of smoke, dust, and fume and recovery of valuable materials from them, but his ingenuity underlies many other modern developments in science and industry.

11560 Quality Control and Industrial Statistics. Acheson J. Duncan. 663 pages. 1952. Richard D. Irwin, Inc., Chicago. (TS155 D91q)

Intended primarily as a text for engineering and business students in their 2nd and 3rd year of college. Also intended as a reference book for quality-control engineers and industrial research personnel. Main sections deal with fundamentals, acceptance sampling by attributes, acceptance sampling by variables, control charts, and some statistics useful in industrial research. Includes extensive mathematical indexes.

11561* Industrial Research in Switzerland; Its Institutional and Economic Background. Ronald S. Edwards and Charles LaRoche. 111 pages. 1951. Sir Isaac Pitmann & Sons, Ltd., London. (T177.S9 Ed98i)

An introductory chapter is followed by ones on: Swiss Industries and Their Research, The Universities and Industry, Institutions for Co-Operative Industrial Research, The Federal Government as a Sponsor of Research, Research, Taxation, and the Patent System, and Commentary. Appendices describe foundations established by Swiss firms and industrialists, summary of report on supply of key scientists, the scientific societies, Swiss Association for Materials Testing, and government research institutes. 10-page bibliography.

11562* Handbook of Engineering Fundamentals. Ed. 2. Ovid W. Eshbach, editor. 914 pages. 1952. John Wiley & Sons, New York. (TA151 Es33h2)

Sections are as follows: Mathematical and Physical Tables; Mathematics; Physical Units and Standards; Mechanics of Rigid Bodies; Mechanics of Deformable Bodies; Mechanics of Incompressible Fluids; Aerodynamics; Engineering Thermodynamics; Electricity and Magnetism; Radiation, Light, and Acoustics; Chemistry; Metallic Materials; Non-Metallic Materials; and Engineering Law. Replaces 1936 edition.

11563 Fielding's Travel Guide to Europe. Rev. Ed. Temple Fielding. 716 pages. 1952. William Sloane Associates, New York. (D909 F46t5)

A practical guidebook covering the things the average traveler really needs to know to get around in Europe with a minimum of inconvenience and a maximum of pleasure. Covers, for each country, such things as cigarettes, tipping, night clubs, restaurants, local rackets, etc. Omits or de-emphasizes many items commonly found in guidebooks, for instance—museums, art galleries, local history, statistics on exports and imports, etc. Fascinating reading even if you have no intention of going.

11564 A Dictionary of Antibiosis. Leonard Karel and Elizabeth Spencer Roach. 373 pages. 1951. Columbia University Press, New York. (RS161 K14d)

The data included are arranged alphabetically and consist of a compilation of substances tested for antibiotic activity; available information on source, extraction, chemical and physical properties, spectrum in vitro and in vivo, toxicological and pharmacological, clinical and experimental clinical results; and enumeration of organisms against which substances have been tested for antibiotic activity. 55-page bibliography.

11565 Calcul Opérationnel. (Operational Calculus.) (French.) Édouard Labin. 149 pages. 1949. Masson et Cie., Paris. (QA432 L11a)

A textbook, the object of which is to present the subject matter in as simple a manner as possible. Discusses and outlines definitions, fundamental properties of the Laplace transformation, table of transformed curves; multiple and single images; application to the solution of ordinary integral-differential and linear equations to constant coefficients; integral, recurrence, and "difference" equations.

11566 Language and Communication. Ed. 1. George A. Miller. 298 pages. 1951. McGraw-Hill, New York. (BF455 M61L)

An advanced college textbook written to fill a specific need encountered by the author. Purpose is to combine the more important approaches to the study of communicative behavior. Introduction is followed by chapters titled: The Phonetic Approach; The Perception of Speech; The Statistical Approach; Rules for Using Symbols; Individual Differences; The Verbal Behavior of Children; The Role of Learning; Verbal Habits; Some Effects of Verbal Habits; Words, Sets, and Thoughts; and The Social Approach. 11-page bibliography.

11567 Why I Escaped: The Story of Peter Pirogov. 336 pages. 1950. Duell, Sloan and Pearce, New York. (Translated from the Russian.) (HC331 P66W)

The personal history of an officer in the Soviet Air Force who, after long deliberation, decided to fly away to a strange land, giving up the girl he loved. He is a fairly young man, so has never experienced other than the Bolshevik regime. As a flyer, he had been quite successful in adjusting to Soviet conditions, yet his resentment at the things he observed and experienced gradually built up to the breaking point, especially when the end of the war brought no improvement.

11568 Skin Therapeutics Prescription and Preparation (Materia Medica Dermatologica). M. K. Polano and Clarence S. Livingood. 276 pages. 1952. Elsevier Publishing Co., New York. (RL801 P75s)

Provides a system to facilitate prescription of all medicaments necessary in skin therapy with the help of the official pharmacopoeias and formularies. Many new prescriptions for ointments are recommended in the light of the author's own experiments and careful clinical investigations. A number of tables facilitate comparison on the pharmacopoeias and formularies of the U. S., Great Britain, Belgium, France, Germany, Denmark, Netherlands, Italy, Switzerland, Spain, and Sweden, and give the equivalents of the dermatological medicaments in these countries.

11569 Experimental Air-Borne Infection. Theodor Rosebury. 222 pages. 1947. Williams and Wilkins Co., Baltimore. (RC112 R72e)

Equipment and methods for the quantitative study of highly infective agents; basic data on their use obtained with phenol red, *Serratia marcescens* and *Bacillus globigh*; and preliminary experiments on the stability and infectivity for laboratory animals of air-borne clouds of *Brucella suis, Malleomyces mallei Malleomyces pseudomallei, Pasteurella tularensis,* and of viruses of the Psittacosis group. Prepared with assistance of the staff of the Laboratories of Camp Detrick, Md. Investigations conducted between Dec. 1943 and Oct. 1945.

11570 Copyright and Industrial Designs. A. D. Russell-Clarke. 261 pages. 1951. Sweet & Maxwell, Ltd., London. (Z551 R91c)

A comprehensive work embracing all branches of copyright law. Covers copyrights in literary, dramatic, musical and artistic works, also copyright in industrial designs. Footnote references.

36. *Miscellaneous*

11571 Practical Photogrammetry. H. Oakley Sharp. 229 pages. 1951. Macmillan Co., New York. (TA593 Sh23p)

First part is devoted to fundamental theories used in both terrestrial and aerial photographic surveying. Second part is devoted to important practical applications. Numerous diagrams and illustrations.

11572 Tungsten: A Treatise on Its Metallurgy, Properties and Applications. Ed. 3. Colin J. Smithells, editor. 326 pages. 1951. Chapman & Hall, Ltd., London. (TN799.T9 Sm68t3)

Includes footnote references.

11573 Mineral Forecast, 2000 A.D. Edward Steidle. 216 pages. 1952. Pennsylvania State College, State College, Pa. (TN153 St33m)

Part One discusses "Minerals and Posterity" in general terms under such headings as: Pervasive Issues; The Road Ahead; Conservation Factors; Mineral Unpreparedness; Point Four, etc. Part Two, after 3 introductory chapters, takes up specific mineral types in more detail. Also covers geology, meteorology, geography, safety and health, water supplies, atomic energy, mineral extraction, mineral-industries education, and mineral policies. Illustrated.

11574 Positivism. A Study in Human Understanding. Richard von Mises. 404 pages. 1951. Harvard University Press, Cambridge. (Q175 M68ktr)

Gives a straightforward introduction to and comprehensive synopsis of the lines of thought that have come to be known as "positivistic", non-metaphysical, or empiricist. It is based on the belief that the physicist's striving for clarity, sincerity, and objectivity and his achievements in his limited fields are goals for the unprejudiced mind in its encounters with all its problems. Opens with a careful critique of language. It goes on to show how the same principles which were instrumental in the creation of everyday language gradually branch out into the more specialized languages of science, art, and ethics. Aim is to show that common sense, straight reasoning, respect for what experience provides, and continuing intellectual curiosity are what gradually bring order out of chaos in all fields of inquiry.

11575 How Strong is Russia? T. Zavalani. 244 pages. 1952. Frederick A. Praeger, New York. (HC335 Z19h)

Gives the history of the several "5-yr. plans" embarked upon by the Soviet government since 1928. Shows that, after a beginning characterized by genuine popular enthusiasm, fulfillment gradually deteriorated; and that the much-publicized gains in consumer goods have been strictly illusory. Only in heavy industry and in armaments have the Soviets been reasonably successful. Initially fairly complete statistical data emanated from Russia, but this situation gradually changed until, at present, no reliable figures are directly available. Contains a wealth of information collected by devious means which should be very useful in estimating the present economic and military potential of the U. S. S. R.

11576 Proceedings, Fifth Annual Management Engineering Conference: Effective Utilization of Manpower. Unpaged. 1952. Agricultural and Mechanical College of Texas, College Station, Tex. (T58 T31e)

Mimeographed collection of talks and papers presented at above conference, Feb. 27-28, 1952. Among the topics are: use of handicapped workers, economic education of workers, organization for effective utilization of manpower, productivity factors and figures, community factors influencing worker satisfaction, effect of national economic conditions on the businessman, human factors in management, and electronic devices for office work (description of Remington Rand "Univac").

11577 Scientific Survey of South-Eastern Scotland. 207 pages, 1951. Local Executive Committee, British Assn. for Advancement of Science, Edinburgh, Scotland. (HC247.G.7 B77s)

Separate chapters by different authors cover such topics as geography, climate, history, public health, agriculture, mining, manufacturing, population, etc.

11578 Titanium Metal and Its Future. 103 pages. 1952. Harvard Business School, Cambridge, Mass. (TN799.T5 T53)

A group project by nine 2nd-year students at the Harvard Graduate School of Business Administration. It is not a thesis; it is not an official publication of the Harvard Business School; it is an assigned project in partial fulfillment of the requirements for one course. The information incorporated in the report was obtained from 3 major sources: published material appearing in company and government literature, statistical reports, and magazine articles; personal discussion with some of the Ti producers and research organizations; correspondence with other Ti producers and potential consumers of Ti. Covers history, properties, alloys, ores, processing, melting, forming, fabricating, and the industry today and in the future. Includes short selected bibliography.

11579 Wood. 176 pages. 1952. His Majesty's Stationery Office, London. (Selected Government Research Reports, vol. 8.) (TA419 G79w)

Consists of 21 separate reports on different aspects of the commercial use of wood as a constructional material.

11580 Soviet Geography. A Bibliography. Part II. Administrative, Natural and Economic Regions. 325 pages. 1951. Library of Congress, Washington. (Z2491 Un3s)

Classified by large and small areas. Author and subject indexes.

11581* Directory of International Scientific Organizations. 224 pages. 1950. United Nations Educational, Scientific and Cultural Organization, Paris. (AS8 D62)

11582 International Pharmacopoeia. Ed. 1. Vol. I. 406 pages. 1951. World Health Organization, Geneva, Switzerland. (RS139 P49)

This first international pharmacopoeia is published in fulfillment of a long-expressed desire for the unification of pharmacopoeias. The various national pharmacopoeias, being produced independently to meet the needs of different countries, exhibit differences in standards, strengths, and nomenclature of drugs in accordance with differences in national medical and pharmaceutical practice.

See also:

10070 (patent law in metal finishing)
10679 (elementary explanation of aircraft flight—book)
10888 (oil-well drilling fluids—book)
11064 (treatise on medicinal chemistry)
11360a (new journal subscription)
11410 nonmagnetic steel—processes and properties)

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